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# ADDRESS AT THE ANNUAL GENERAL MEETING

*of the Society, held on 13 June 1949, by the President*

SIR HARRY LINDSAY, K.C.I.E., C.B.E.

I PROPOSE TO REVIEW the activities of the Society during the past year under separate heads, taking first its international, then its national activities and ending up with its internal or, as I might say, its home affairs; including, of course, finance. This is not by any means a scale of descending importance; rather the reverse. It is an ascending scale, for the Society's activities, their extent and character, depend on the health and strength of the central body of Fellows which it is the privilege of your President and Council to represent.

To begin then with the international aspects of the past year's work, you will remember that in 1947 my predecessor Lord Rennell mentioned in the course of his Presidential Address the formation—under the chairmanship of our Foreign Secretary, Mr. J. M. Wordie—of the Joint Polar Research Committee of this Society and the Scott Polar Research Institute. To this Committee is entrusted the task of collaborating with Norway and Sweden in the preliminary plans for a joint expedition to Queen Maud Land in the Antarctic. It includes representatives of Departments of His Majesty's Government as well as representatives of the three southern Dominions—Australia, New Zealand, and South Africa—so that they may be fully informed of our plans and may, as we hope, arrange their own scientific programmes for Antarctic exploration as far as possible in concert with us. The need for closer scientific cooperation between the many nations concerned with the Antarctic is now outstanding and for this reason the first approaches to your Society from Norway and Sweden as regards cooperation in this great expedition were especially welcome. Indeed, the first contribution of £2000 towards its financing was made through the Society from the Geographical Magazine Trust Fund. Further sums of £20,000 have now been allocated by His Majesty's Government and by the Swedish Government; the principal cost will be borne by Norway, the chief participating country. I should like to record here a generous personal donation of £250 from a member of your Council, Mrs. Patrick Ness.

The Expedition, under the Norwegian flag and leadership, will sail in November of this year. The ship will call at a south coast port to pick up the specially bred dogs which have arrived in this country from the Antarctic —actually, this very day—as a gift to the Expedition from His Excellency the Governor of the Falkland Islands. It will include an air unit provided by the Royal Air Force and, both in the high standard of its equipment and in the excellent prospects of scientific discovery which Queen Maud Land offers, it will be by far the most important Antarctic expedition in which this country has participated for very many years. The Expedition will be away for nearly three years.

To continue with the record of the Society's activities in the international field: Other international occasions with which we have been concerned have been the meetings of the International Geological Congress and the International Civil Aviation Organization, both held during the year in the Society's House and, most important, the International Geographical Congress, held at Lisbon in April and the first since the War, which was attended on our behalf by Professor Austin Miller and by Mr. L. P. Kirwan, our Director and Secretary.

Turning now to what I have called our national activities, those of more than purely domestic interest, first place must go to the Christmas Exhibition "Navigation through the Ages." This we held in conjunction with the Institute of Navigation which, as you know, is established in the Society's House and in whose formation the Society played a prominent part. The Exhibition, open like all our exhibitions to the general public, was attended by some 15,000 visitors, including parties from many schools. It was, I think, the first exhibition of its kind in any country, and displayed not only relics and the instruments used by great seamen of the past but also a wide range of the latest aids to navigation, representative of the leading part this country has played in the development of radar and other modern techniques. It was opened by His Royal Highness the Duke of Edinburgh who in his speech took the opportunity to emphasize the great debt owed to the navigators of the past by the explorers and geographers of to-day.

The promotion of exploration and discovery has always been one of our foremost duties. Exploration, it is true, has changed in character; the broad framework, the opening up of the last stretches of the undiscovered world, has already been achieved and the records of this Society are full of the names of those British explorers who have been foremost in this great pioneer work. But if modern exploration is more specialized, more scientific, the zest for it is if anything greater than ever before. This year we are helping to support with funds and equipment—from our own resources or derived from the generous benefactions of the Geographical Magazine Trust Fund—a total of ten expeditions in the field. Two, promoted by the Oxford University Exploration Club, are to work as far apart as North-East Land in the Arctic and Mount Kenya. One, from the Oxford Department of Geography, is engaged in a regional survey of Cyprus. Four from Cambridge University are to work in East Greenland, in Spitsbergen, in Algeria, and in Spain. An expedition from Durham University is to continue their last season's geographical work in Iceland. And finally, an expedition has already left for

Nepal under the leadership of H. W. Tilman, to investigate the botany, geology and physiography of the Tibetan borderland.

To assist such expeditions financially or in other ways is, in the opinion of your Council, an essential function of the Society. With the growth of new exploration clubs in the Universities, a notable and most welcome development of the post-war years, and with the easing of restrictions on travel, such expeditions will undoubtedly increase in number if financial support can be found and to provide such support, appropriate to the greatly increased costs of equipment and transport, is likely to become an increasingly heavy commitment on our resources. Your Council has nevertheless decided that it is of the utmost importance to encourage this work, and particularly the training of the young explorers who are coming forward in large numbers, by allocating increased funds for the purpose. To do so out of current income may well prove to be impossible. I therefore make a special appeal to all Fellows and well-wishers of the Society to contribute by donations, benefactions and bequests, on no matter how small a scale, towards the building up of a special fund for exploration. I am sure you will all agree that our inability to respond on a satisfactory scale to the initiative now being shown by potential explorers among the young men and women in this country would be a sad denial of our most cherished traditions. It is a matter not only of private but of national importance. It is hard to think of an object to which such funds as may be available in these hard times could be better devoted or which would pay a better dividend in terms of human knowledge and national prestige. I am confident that there are many among our Fellows who feel the same. You may be sure that such assistance as we can now provide is not lightly given. It is the task of one of the Committees of the Society—the Research and Expeditions Committee under the able chairmanship of Mr. J. A. Steers, Professor designate of Geography at Cambridge—to investigate all applications for grants and to report its findings to the Council.

Reference to the Committees of the Society brings me to the setting up this year of a new Committee, the Education Committee, under the experienced chairmanship of Dr. Laborde, senior geography master at Harrow School. Just as the Research Committee, which includes representatives of the University Departments of Geography and of cognate sciences, is concerned with the promotion of research at the university level and with the application of geographical technique in diverse fields such as Colonial Development and Town and Country Planning, so the new Education Committee, with representatives from schools of every type, will concern itself with the general furtherance of geography as a school subject and particularly with the promotion of more scholarships, with improvements in textbooks and with the promotion of such new aids to geographical teaching as geographical films. This Committee also achieves the important result of reinforcing our traditional ties with the Geographical Association.

But the work of the Committees of the Society, wide though their scope may be, by no means covers the whole range of external activity in which your Society is engaged. The National Commission for UNESCO, the Advisory Committee to the Secretary of State for the Colonies on the survey of the Falkland Islands Dependencies, the Defence Research Committee of

the Royal Society and the newly proposed National Institute of Oceanography are among the many organizations on which your Society is represented. They reflect the many ways in which the modern geographer can contribute to practical as well as to scientific affairs.

One of the principal services which your Society renders not only to Fellows and students but also to Government Departments and the general public lies in the work of the Library and Map Room. By our Royal Charter we are, as you know, under an obligation to maintain our Map Room for public as well as private use. This compels us not only to keep as complete a collection of maps as possible from every country and on every scale, but to answer, as best we can, geographical enquiries from all quarters. The need to maintain a public Map Room involves us in heavy costs these days, in the purchase of both maps and map cases, and the burden of public and official requests for information is falling heavily on our limited staff. We are grateful, therefore, for a recent increase of £200 in the annual grant which we receive from public funds towards the upkeep of the Map Room. Even so, its cost is far from covered, and this cost will certainly increase still further as the services we render to the general public in this respect become, as they are becoming, more widely known. As evidence of the magnitude of our task in the Map Room I need only tell you that over 50,000 sheets of maps have been entered and catalogued in the last few years. The same number still remains to be dealt with, apart from current additions.

The number of volumes lent from the Library—amounting this year to 5255—has now returned to pre-war level. And here, too, the numbers of enquiries received from members of the public are steadily growing. It is, indeed, a most difficult problem to decide to what extent we are morally bound to comply with these requests for information which, in the case for example of Government Departments, frequently involve our small staff in lengthy research. These are some of the problems facing our Librarian, Mr. Crone, and the Library and Maps Committee under the skilful guidance of Professor Fawcett, its chairman.

Before turning to what I might call "The Home Front," and reviewing briefly our financial position and the situation of our Fellowship, I have a customary sad duty to perform and that is to record the deaths of distinguished Fellows which have occurred during the past year. From our small and select band of Honorary Members we have unhappily lost Dr. Johan Hjort, the distinguished oceanographer, who was President of the International Council for the Exploration of the Sea. Among our Fellows, I must mention Dr. W. F. Hume, the distinguished geologist, who was for so long Director of the Geological Survey of Egypt; and Colonel E. L. Strutt, who was second in command of the 1922 Mount Everest Expedition and for some years Editor of the *Alpine Journal*. Finally, there is one whose loss will have been especially felt by many of you here to-day and by the older members of the staff of the Society: Edward Heawood, a scholar of international repute, who rendered distinguished and loyal service as Librarian of the Society for over thirty years.

I turn finally to the important question of our Home Affairs; for, as I said before, the activities of the Society in the international and national fields of

geography are all based on the strength and security of our own Home Front. To some extent our strength must be financial and in this sphere your interests are closely watched by the Finance Committee under the able chairmanship of Mr. Leonard Brooks. It is the duty of this Committee with the Council's backing to see that a maximum possible of income is assured to the Society and that it is spent on objects worthy of our Charter. Income depends chiefly on the volume of subscriptions of Fellows and Associates and it is interesting to note that our membership in 1938 was 5866 Fellows and the income over £21,000; after the set-back in membership and revenue occasioned by the war we have at last beaten 1938 with a membership of 6217 (including Associates) and an income of over £23,000. But in the ten years 1938–48 salaries, wages and costs of every kind, especially in the printing of the *Journal*, have risen enormously. We need a much higher income to-day if we are to provide the services of ten years back. The rate of the annual subscription has remained unchanged since 1905, despite the great decline in the value of money; if, as your Council hopes, we are to avoid any addition to our subscription-rate, it is imperative that we should further increase our membership. We have still to recapture and pass the record of 6452 in 1930 and the record income from subscriptions of £15,328 in 1931. Your Council is doing its best to remedy this state of affairs and it looks to all Fellows to cooperate to the fullest possible extent by introducing new Fellows of suitable calibre who will pull their weight together with us and whose experience and enthusiasm for our aims will help to maintain the prestige of the Society, built up on the continuous and successful efforts of 118 years.

Thus our strength and prestige depend ultimately on the services which we render partly to our own Fellows and, as I have already described, partly also to the general public. I should add that a special Sub-Committee of the Finance Committee has recently been constituted which will examine thoroughly ways and means to provide for the maintenance and improvement of these services, for the reorganization of our Museum and for giving financial assistance to research and exploration consonant with the object of the Society: the advancement of geographical science.

It is wise, now and then, to take stock of our general position, the rate at which we are spending, the objects secured by expenditure, the proper adjustment of expenditure to income. It is not going to be easy, for certain capital improvements are urgently necessary to bring this splendid House and Hall into line with modern standards; and maintenance is handicapped by high prices and wages. But we are fortunate in having a reliable and energetic staff to back us up. We are also fortunate in that we were able during the war to build up our general reserve as a result partly of war economies, partly of the generosity of Fellows and benefactors. Capital improvements will have to come out of that reserve: future maintenance standards will depend of course on future income.

It is not idle in all these circumstances to hope that, with improved amenities and general services to our Fellows, our membership will increase and with it the revenue on which our future fortunes depend.

# SOME MEDIEVAL THEORIES ABOUT THE NILE

O. G. S. CRAWFORD

*Afternoon Meeting of the Society, 14 March 1949*

THIS PAPER DEALS with some of the theories about the course of the Nile which were held during the late medieval and early modern period. The title needs amplification; it was difficult to find one that would be both concise and at the same time adequately descriptive. The idea of writing the paper came from Dr. Mannoni's publication of the mid-fifteenth-century map of Abyssinia called Egyptus Novelo; [1] and that led to an examination of Fra Mauro's almost contemporary world-map covering the same region. No detailed examination of the places marked on Egyptus Novelo has been published; one such was begun just before the war by a German scholar, but he died during the war, and his notes cannot now be found. Fra Mauro's map is better known; an excellent facsimile is published in De la Roncière's 'Découverte de l'Afrique au Moyen Age'; but when I came to examine his identifications I found so many errors that it seemed desirable to start afresh. De la Roncière's book is a most useful compendium, but the subject is vast and the treatment superficial; one gets the impression that the author has lost his way among his notes. The facsimile reproductions of old maps (with the exception of that of Fra Mauro's) suffer from the fact that the names are often tantalizingly illegible, and they are not printed in the text. Such reproductions seem to be a waste of money.

I propose therefore to consider in some detail the topography of the Upper Nile region as shown on these two maps, showing later how obstinately the Ptolemaic system resisted the incorporation of new facts. If I had time I should like to enlarge upon this topic, for the medieval cartography of Africa illustrates admirably the power of an established system to retard the advancement of knowledge. In the realms of astronomy and geology that retardation is well known; but in cartography the rôles were reversed, for it was the Christian Church which led the way. So far as the interior of eastern Africa was concerned, it was chiefly the missionaries who made the discoveries—or at any rate they were the chief recorders; and it was the cartographers who adhered to the older ideas long after they had become obsolete. The cartographers tried to make the best of both worlds, incorporating new discoveries without omitting the Ptolemaic detail.

All the maps are of course based ultimately on travellers' tales, and the sources can often be detected from internal evidence. The cartographer questioned returning travellers, no doubt wrote down their replies, and made some rough preliminary sketch-maps. Some of these travellers' itineraries have survived, and I shall refer to them again in a few miuutes; others must have existed and perished. The Zorzi itineraries, compiled in 1524 and the

[1] I wish to thank the editor, Professor Almagià, for kindly sending me a copy of this publication.

years immediately preceding, are much fuller than the others; but they remained in manuscript until 1879, and have only recently been published in full by Professor Conti Rossini, to whom I am indebted for a copy of his edition.[1]

Some would add to the list another source—imagination. It is true that the courses of many rivers and mountain ranges were fanciful, and that on the later maps imagination ran riot. But the names were not imaginary. It is far easier to copy than to invent. It is usually possible to trace the pedigree of the names; and we find that all go back to some known source. This does not, of course, apply to the animals which conveniently fill the open spaces.

The maps are of two kinds; those covering the whole of known Africa and those covering only part of it. Those of the first group begin with Carignano (*c.* 1320), Dalorto (1325), Dulcert (1339) and their imitators, and Pizzigani (1367); their chief characteristics remained almost unchanged during the succeeding centuries. At or above Assuan the Nile divides into two branches coming from the south-west and south-east respectively: the south-west branch turns to the west, rising in a marsh which is also the source of another river flowing westwards to the Atlantic. Parallel with this westward-flowing river on the north is a long range of mountains extending from the Atlantic to Egypt, where it trifurcates into a figure like a bird's claw. With minor variations this scheme persisted down to the eighteenth century, when the central river had split into two, the southern becoming the Senegal which rose in Lake Chad (Borno Lake), and the northern, called the Ghir or Nubia river, rose in Morocco and pursued its course eastwards across the Sahara by Air, Agades and a doublet of Lake Chad (called by Moll the "morasses of Nubia") joining the Nile below Aswan. One of the branches of the Nile rises in the Mountains of the Moon. Idrisi makes both branches rise there, and adds a third, giving the mountains the Arabic name of Jebel Kamar. The maps of the whole of Africa culminate in that of Fra Mauro (1459) whose map covered the whole known world. I shall deal with it at length later.

The maps of the second group which I have selected for special consideration are two covering Abyssinia only. One is that called Egyptus Novelo, embodied on a sheet of a Ptolemy atlas at Paris and dated (I am assured by Professor Almagià) before 1454; the other, which I can only mention briefly, was compiled to accompany and illustrate Almeida's History of Abyssinia and bears the date 1662. In connection with these I shall mention the itineraries of *circa* 1400 and 1482, and the narrative of Alvarez (1520–26).

Apart from the maps already discussed, the earliest European source of information about the Upper Nile region is contained in 'The Book of Knowledge,' compiled by a Spanish monk soon after 1348. The author obtained his information from sources which have not survived, some of which may also have been used by Dalorto.[2] Though cast in the form of a "travelogue," the book is actually no more than a geographical handbook. The author states that there were Genoese merchants in Dongola; they may have penetrated thither as a consequence of the commercial treaty of 1290

[1] Carlo Conti Rossini, "Geographica," *Rassegna di Studi Etiopici*, anno 3, no. 2 (May–August 1943), pp. 175–99.

[2] Rossini, *Bull. Soc. Geogr. Ital.*, fasc. ix–x (1917), 679.

between Genoa and Egypt. He gives a list of places in Abyssinia, but they are difficult or impossible to identify. The emperor, Preste John, resided at Malsa.

Later in the same, the fourteenth, century Philip de Mezières obtained some information from a Genoese and also from a Venetian called Bragadino who went to Ethiopia by way of Egypt, Thebes and the Red Sea. Bragadino mentioned a king of Nubia who was as "black as a Moor"; the implication is that he was himself not a Moor but a Christian, whom one would expect to be white. Next after this king was "Prete Jane." Bragadino lived for eight years in the city of Cambaleh, which is to be identified with the city of Canbala marked in Idrisi's map of 1192 on the African coast south-east of the straits of Bab-el-Mandeb.[1]

The first European embassy to reach Abyssinia was that sent by the Duke of Berry, and consisted of a Neapolitan called Pietro, a Frenchman and a Spaniard. Bertrandon de la Brocquière met Pietro in Pera in 1432; Pietro had married an Abyssinian woman, and gave an account of Abyssinia that is largely fabulous.[2]

None of these three authorities tell us much about the countries concerned. The next, however, is much more valuable, for it is the itinerary of an actual journey from Venice by Rhodes, Cyprus, Jerusalem and Cairo to the court of Preste John in Shoa. The name of the Emperor is given as David, enabling us to date the itinerary to the reign of that ruler (1382–1411). From Cairo the traveller proceeded up the Nile to the Riff (probably Kus), thence across the desert to Aidab, thence by land to Suakin, thence by Adam, Maria (where Ethiopia was entered) and Tuoaita, Dubeb, Antisiment, Ligaxon and Turat to Axum. After Axum no places are mentioned but only the names of the provinces traversed—Anghuda (Angot) and Chaamera (Amhara). The itinerary concludes with a list of provinces of Abyssinia and the names (actually the titles) of their rulers, which are sometimes confused with each other. The itinerary is the first unambiguous account of Abyssinian geography which has survived; it certainly refers to the journey of a European, and the route followed can be identified pretty accurately. South of Maria it is the same as that indicated on later itineraries and maps. We need not therefore be unduly disturbed by the author's one lapse—the remark that from Shoa to India was a journey of four days. His further statement that in India reposed the body of the apostle Thomas indicates that he or his authority was a European Christian, perhaps a missionary.

I now come at last to the first of the three maps which are the main subject of the present paper—that called Egyptus Novelo (Fig. 1). Its history has already been dealt with by Dr. Laura Mannoni,[3] and here it will be sufficient to state that the original is in an atlas of Ptolemy in the Bibliothèque Nationale

[1] There is a place called Ambuleh immediately outside Jibouti. For Bragadino see N. Jorga, *Cenni* (1910) p. 140. Philip de Mezières recorded the facts in an unpublished poem called "Songe d'un vieil Pélerin," in the Bibliothèque de l'Arsenale, Paris, MS. 2682, fol. 52, dated A.D. 1389.

[2] See 'Hans Schiltenberger's Reisebuch,' ed. Langmantel, Tubingen, 1885, pp. 67, 73.

[3] *Pubblicazioni dell'Istituto di Geografia della R. Università di Roma*, series B, no. 1 (1932).

at Paris, and that it is to be dated before 1454. It is therefore almost contemporary with Fra Mauro's map of 1459. The northern part of it is mainly from Ptolemy; but the southern part is obviously based upon first-hand observation and is, for the time, a remarkably good approximation to the real geography of Abyssinia of which it is the first map. It is far nearer to reality than many later maps, such as those of Pigafetta (1591) and van Meurs (1668).

This is not the place to discuss in full the identification of the place-names given on Egyptus Novelo. I have of course tried to identify them, and the figure (Fig. 2) shows where they fall on the modern map. It will be seen that, with one exception, there are no names at all west of the longitude of Lake Tana; the names all occur on or near the Great Ridgeway of Abyssinia, which throughout history has been its main artery. Before the Muhammadan conquest of 1540 the political centre of Abyssinia was (as now) in the south. There was no fixed capital; the emperor moved about from place to place, collecting tribute, living on the land and maintaining the allegiance of the provincial rulers. The old maps show us pictures of his tents in which he and his court lived, and Alvarez has left a long and graphic account of its elaborate organization and ceremony. There were however certain places where the court regularly pitched its tents and one of these, Barara, is sometimes described as the capital. Its exact situation is unknown, but it was close to Addis Ababa, and it was the terminus of the Great Ridgeway, which ran northwards from it and for a great part of its course followed the watershed between the Nile basin on the west and the Red Sea on the east. Egyptus Novelo does not mark any roads; but it does bring out well the basic fact of a watershed, with a number of rivers running eastwards from it. Much confusion would have been avoided if this basic fact had been realized by later cartographers.

To understand the river-system of Egyptus Novelo it is necessary to describe very briefly the true course of the rivers mentioned. In the south the chief river is the Hawash, rising south-east of Addis Ababa and flowing east, north and then east again towards the Red Sea but ending about sixty miles inland in the swamps of Aussa. The Abai rises south of Lake Tana, flows through it, and after encircling Gojam enters the Sudan at Fazughli and becomes the Blue Nile, joining the White Nile at Khartoum. Above Tana one of its tributaries is the Kwoga. Between Tana and Fazughli its chief tributaries (for our present purpose) are, on the left bank the Bashilo, the Wanshit-Jamma, the Muger and the Dadessa with its tributary the Angur; and on the right bank the Abai.

The Tacaze and its feeders rise in the Lasta mountains which run north-westwards from the main watershed and ridgeway and whose highest point is Abuna Josef (4190 metres), between Maraua on the north-east and Lalibela on the south-west. The region is called Kamir on the 1/2 Million map and is inhabited by the Kamir Agaus. The significance of these names will be discussed later; for that reason I would ask you to bear in mind that it is here that the Tacaze, so often regarded as the main branch of the Nile itself—and called by that name in the fourth century inscription of Adulis—has its source. The tributaries of the Tacaze on the right bank are the Tsellari and its tributary the Zamra, the Arecua, the Mai Ueri and the Firfira; on the left

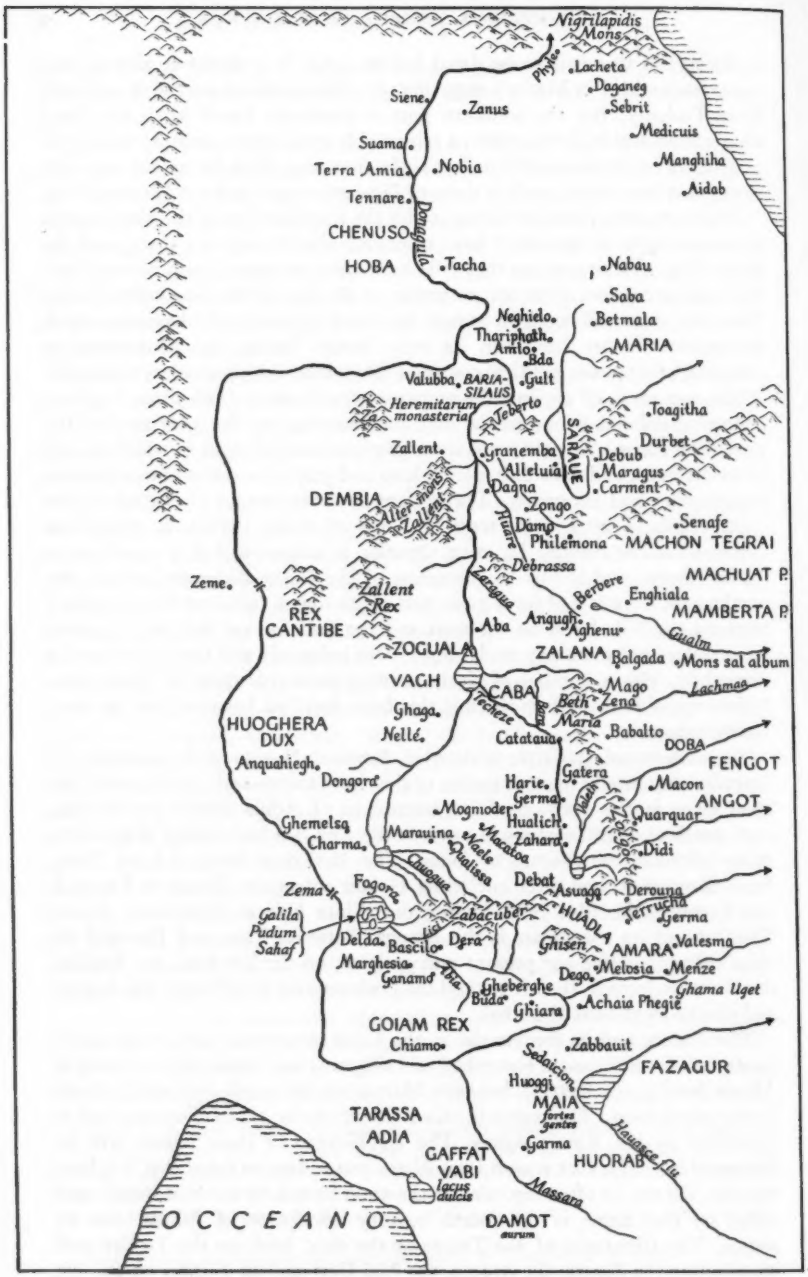



*Fig. 1. From the Egyptus Novelo map (c. 1454)*

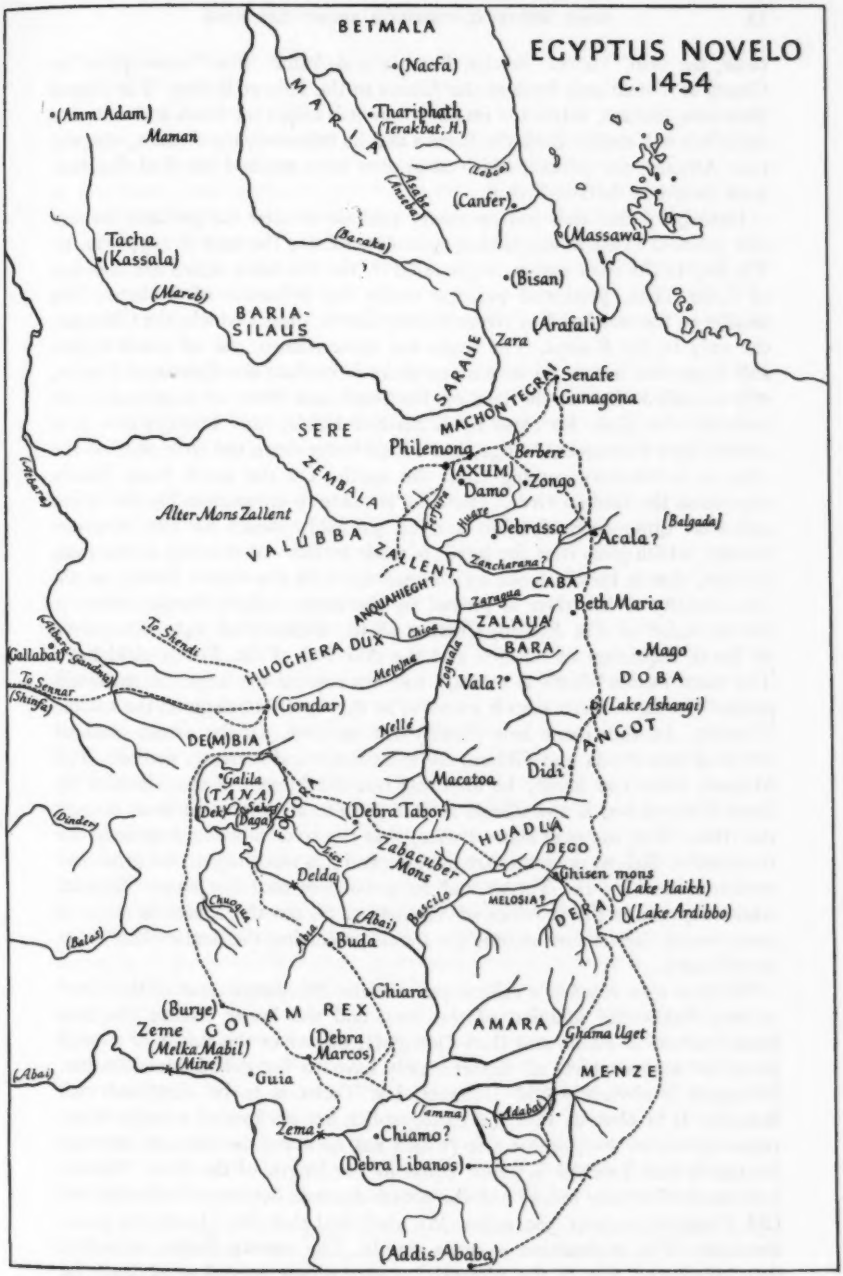



*Fig. 2. The location of place names on Egyptus Novelo: modern names in brackets, roads added*

bank, the Nili, Menna, Sciaha, Berchia and Ataba. The Tacaze joins the Goang at Tomat and flows as the Atbara to the Nile at Berber. The Mareb rises near Asmara, enters the Sudan where it is called the Gash and ends in a delta below Kassala. Both the Baraka and its tributary, the Anseba, also rise near Asmara; the Baraka, which must once have reached the Red Sea, now loses itself in a delta at Tokar.

Having by this dull but necessary prelude cleared the ground, we can now proceed to the more exciting task of examining the map of 1454 (Fig. 1). The key to the river system is provided by the two lakes which are doublets of Lake Tana, produced perhaps under the influence of Ptolemy. The smaller of the two has four rivers flowing into it, one of which, the Chuogua, can only be the Kwoga. The larger has three islands, one of which Galila, still bears that name; on its eastern shore is marked the district of Fogora, still so called. Out of the lake on the south-east flows an unnamed river, certainly the Abai, for close by is marked Delda, now Didil, where it is crossed by a Portuguese bridge, and a little lower down the river receives the Abia as a tributary coming from the south. On the north bank Bascilo represents the Bashilo river. The Abai is made to curve round to the south and west quite correctly; but a river, probably meant for the Wanshit-Jamma, which joins it at the bend, is made to flow off the map to the east; at least, that is how it looks by comparison with the others farther north. The identity of this river is proved by the name Achaia Phegie, which is the Achiafed of Fra Mauro, Chiafeg of the itinerary of 1482, Chegefege of Zorzi, Aquiafagi of Alvarez and the Ahi Faǧ of the Futuh al Habaša. The name means "death to mules," and was applied to dangerous mountain paths. On the modern map it seems to be that spelt Haiafegg on the middle Wanshit. Another name here (Acala) still survives. Of the names south of the Abai two (Buda and Ghiara) are identifiable and correctly marked. The Massara river can hardly be anything but the Muger. Zema, doubled by Zemé lower down, is now Zemié in Baso, where an important road crossed the Abai. Here the map states (twice) that the river flows underground for three miles. Below, no names are marked, and it is made to join the combined stream formed by the Tacaze and its tributaries near the name Valubba, which represents the province of Woldebba. So too the Mareb is made to curve round Saraue and become the Baraka, receiving the Asabe (Anseba) as its tributary.

We have now reached a critical point in the disentanglement of the river-system. Below the junction of the Abai and the lower Tacaze the next place marked is Tacha and then Donagula, placed in the midst of a small group of names which all unfortunately have so far defied identification. Donagula is obviously Old Dongola; but Tacha is to be identified with Kassala. It is obvious that the cartographer has performed a major telescopic operation. For, on his map (which has no scale) the distance between Donagula and Valubba is about equal to the length of the river Ferfura, a distance of twenty miles; but the actual distance between Woldebba and Old Dongola is about 580 miles. We shall find that Fra Mauro did much the same. The explanation is quite simple. The eastern Sudan, which is thus eliminated, was in the fifteenth century almost an unknown land. In

earlier medieval times it formed the southern of the two Nubian Christian kingdoms, that of Alwa, whose capital was at Soba on the Blue Nile, twelve miles above Khartoum. Christianity came to an end in the northern kingdom about the year 1322, when that kingdom was virtually incorporated in Egypt. It may have lasted no longer in the southern kingdom; but whether it did so or not, that whole southern region was cut off from the outer world by a wide belt of Islam. In the sixteenth century it too became part of Islam, as the kingdom of Sennar. The fourteenth and fifteenth centuries are, for this region, a Dark Age, for which there is no history. There is little more for the sixteenth century when Fung sources begin to throw some light; and it is not until 1699, when the First Europeans penetrated to Sennar, that the darkness is at last dispelled.

Cartographers therefore supposed, not unnaturally, that Nubia bordered on Abyssinia, and drew their maps accordingly. Conscientious ones like the author of Egyptus Novelo, tried to forget Ptolemy and set down what they could learn from first-hand sources. What the others did will appear later.

Fra Mauro compiled a map of the world at Venice in 1459. (Fig. 3). He was influenced by Ptolemy, but was no blind follower, and like the compiler of Egyptus Novelo, he incorporated the results of exploration in Abyssinia. He also knew the names of many places in Central Africa down to about lat. 10° N. In order to understand his map, it is necessary first to replot it, eliminating or simplifying the romantic but confusing detail, and to turn it upside down, with north at the top. When this has been done (Fig. 4), we find that the river system of Abyssinia is remarkably correct in essentials; the main watershed on the east is shown, and the Hawash is given a basin of its own. I will begin by tracing the course of the Abaui (Abai). It rises in Fonte Geneth, indicated by a conventional sign for a river source, which De la Roncière misinterpreted as Lake Tana. The name survived a hundred years ago, when Beke [1] recorded it as Mount Djinnit, one of the hills overlooking the source of the Abai. Thence it runs northwards, quite correctly; but the great curve is wrongly begun before it enters Lake Tana, unnamed but indicated by the conventional sign used for lakes. The confluence of the Vuacit (Wanshit) is marked; above the confluence the Vuacit is joined by another river which is continued also eastwards to become the Guaa, a tributary of the Auasi (Hawash). A precisely similar error by Egyptus Novelo has already been noted. Below the Vuacit confluence the Abaui received another tributary rising near Vuiçie and a place named Masara; this corresponds with the Massara of Egyptus Novelo. Here the kingdom of Gogian (Gojam) is marked, on the wrong side of the river, which turns northwards and maintains that direction. We have now arrived at the limits of the known which, judging from Egyptus Novelo, was at the ford of Zemé; and it should be noted that sixteen miles below Zemé the Abai does turn sharply and flow northwards for sixteen miles. I suspect that this fact was known, and that the cartographers assumed that the northward flow continued; or

[1] *Bull. Soc. Geogr. Paris*, 3 sér. ix, plan. The name is not marked on any of the subsequent maps that I have seen, nor is it mentioned by Bruce or any of the others who have visited the spot.

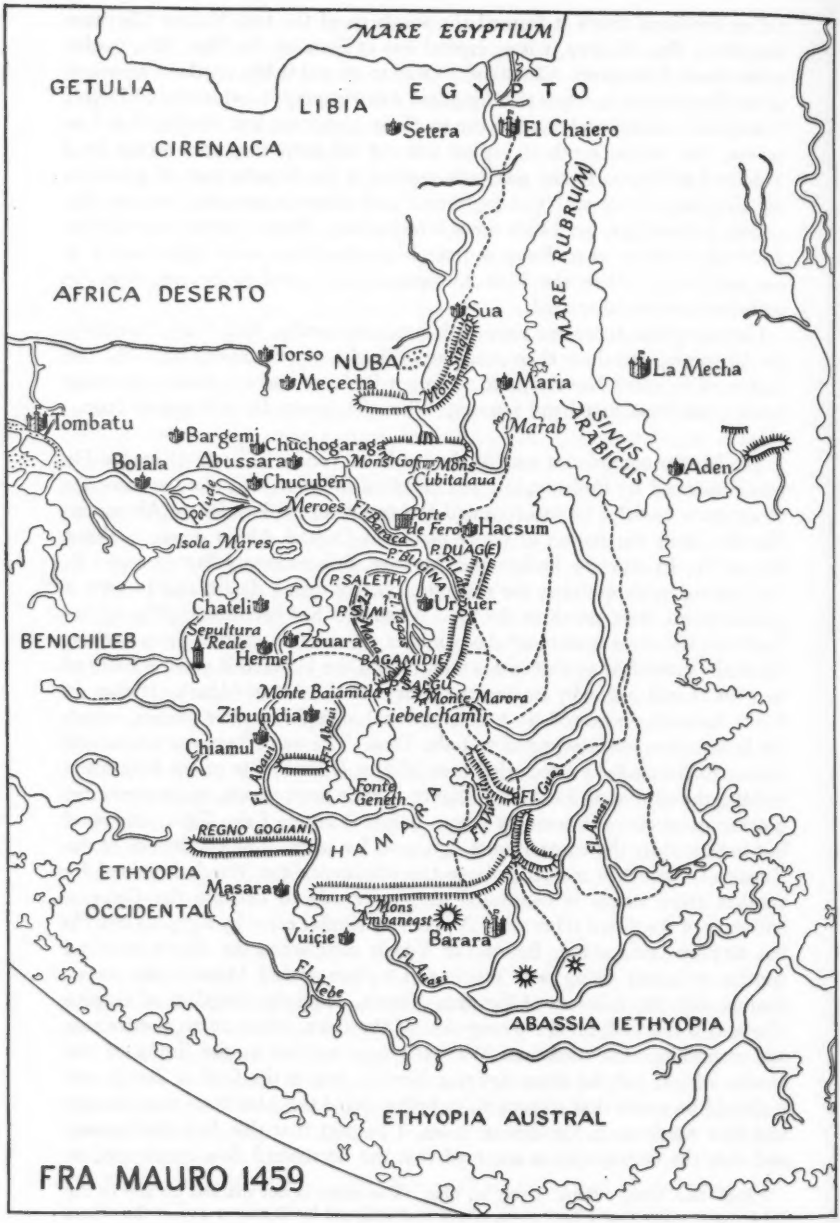



*Fig. 3. From Fra Mauro, 1459*

they may have heard of the much longer reach beyond Wambera where the Abai flows north-north-west for sixty miles.[1] However this may be, both cartographers bring the river round to join the Tacaze, ignoring the whole of the south-eastern Sudan.

The next three names, though misplaced, are identifiable with fair certainty.

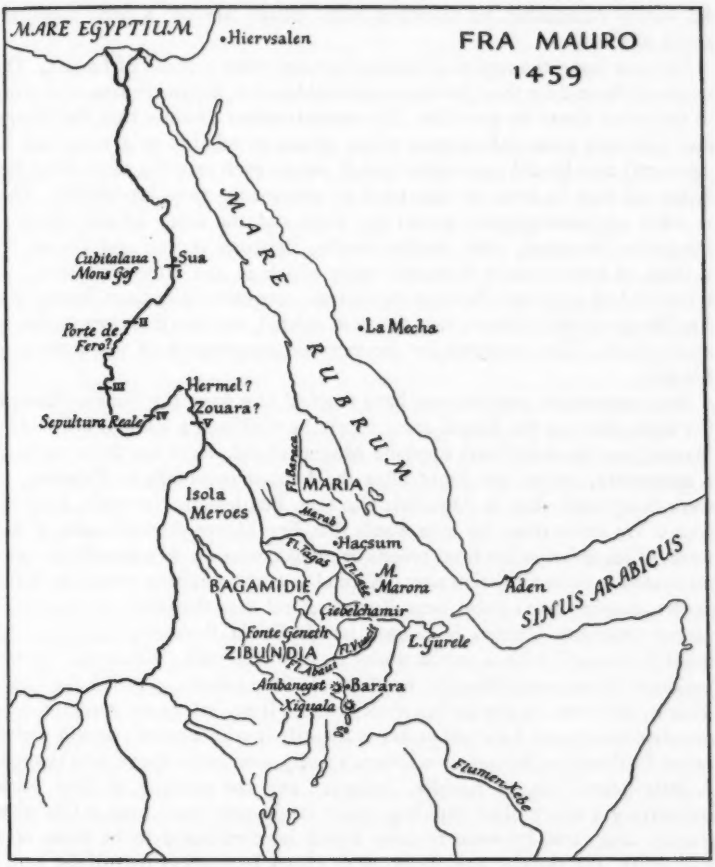



*Fig. 4. The location of Fra Mauro's place names*

Chiamul must surely be the Chiamo of Egyptus Novelo and may be Halchiamé or Hachama, in the fork of the Muger and Abai. Zibu[n]dia must be the region of Zobint in Damot, south-west of Burye, called Zobent in the

[1] After writing this I found the conjecture confirmed by Almeida (mid-seventeenth century) who says that at Miné (now Melka Mabil) the Nile turns north towards Egypt; he is here plainly referring to the sixty-mile reach beyond Wambera.

Abyssinian "Chronicle of Susenyos." [1] Monte Baiameda may be Ba[n]iameda, the district of Banja. De la Roncière, whose identifications are often made without due regard for the relative positions indicated on the old maps, has misread his own facsimile; ignoring the stroke of abbreviation he reads Zibudia and identifies it with Zéboul, *i.e.* Zabul, a detached upland region in the Red Sea basin 200 miles away to the north-west; and Baiameda (which he writes Baiamidia) he identifies with Abuya Myeda, a high mountain south of Dessye.

We now leave the region of known fact and enter a realm of fantasy. The course indicated for the Abai has no resemblance to its true course, and many of the other rivers do not exist. My reconstruction assumes that Fra Mauro had collected some information about places in relation to a river and its cataracts; that he did not realize that it was in each case the same river, the Nile; and that he tried on this basis to arrange his facts intelligibly. That is what any cartographer would do; Beke did the same for the rivers of Southern Abyssinia, with similar results. Between Aswan and Gojam lay a tract of more than a thousand miles which in the fifteenth century no traveller had explored; because he had no astronomically fixed framework, Fra Mauro could not know that this void existed, and was therefore unable to allow for it. That accounts for the extreme compression of this portion of his map.

But some vague reports must have reached him from the Sudan. Hermel, the next place on the Abaui, must surely be Cailliaud's Karmel below Abu Hamed, on the north bank opposite Mograt island. Here are the remains of a monastery, named no doubt after the famous mountain in Palestine, as were many such sites in Abyssinia also (*e.g.* Bethlehem, Nazareth, Antioch, Sion). We know from his own words that Fra Mauro derived some, if not most, of his information from priests or monks, who would naturally be most interested in such Christian sites. Karmel is at the southern terminus of the desert crossing from Sebu near Korosko, and was therefore an important place.[2] Opposite Hermel is Zouara which De la Roncière, changing the inital Z into a C with a cedilla under it, identifies with "Kouarra," *i.e.* the region of Kuara comprising the headwaters of the Dinder west of Lake Tana. This is, however, an impossible identification, if my others are even approximately correct; and I should prefer to identify it with a small riverain region called Ez Zuweira (Sahouera on Linant's map), sixty miles above Abu Hamed. A little below this, at Kuddik, Jackson [3] saw the mosque of Wad Saleh embodying a much older building which could only have been a Christian church, and close by were remains which he considered to be those of a monastery. On the site were bricks with Greek letters and part of the headstone of a grave. Note that Fra Mauro makes Zouara the terminus of a road from Lake Tana; is this not meant for the Atbara route connecting Egypt and Abyssinia? The name Zuweira is of course a not uncommon one, but my

[1] Early seventeenth century (ed. Pereira, pp. 173, 185).

[2] It is tempting to identify it also with the Vrma of Dalorto (1325), the Hurma of Cresques (1375) and Pizzigani (1367), but other more plausible explanations of Vrma have been made.

[3] *Sudan Notes & Records*, ix, p. 28.

selection of this one was made *after* the identification of Hermel had indicated the region.

Below these two places is a conventional sign which may represent a lake or a cataract, in the middle of which is an island; this may be the fourth cataract, which has many islands with remains of buildings on them. A place Chateli nearby might be the celebrated monastery of Ghazali in the Wadi Abu Dom whose ruins, still standing, were planned by Lepsius. On the map Chateli stands near a river which may be meant for the Wadi. There was also in this neighbourhood a famous monastery mentioned but not named by Abu Salih [1]; it may be that seen by English [2] at Kennis twenty-five miles above Merawe.

Near Chateli is shown a structure looking like a Gothic market-cross and named Sepultura Reale. The only possible royal tombs in the whole of this region are the pyramids of Nuri or those of Meroe; and if my other identifications are correct, this must represent them, probably those of Nuri.

Ignoring the Benichileb—so called "because these people have doggish faces"—and following the main channel, we reach Porte de Fero, the Iron Gates, by whose means "the Nile could be made to flow through the land of the Blacks and less (*pocho*) in Egypt." This may be a dim echo of the ancient Egyptian forts at Semna above Wadi Halfa, the southernmost of those controlling the Blacks. Here the river is only forty metres wide at low water, and the forts may well have given rise to the idea of a dam. A tributary called Baraca may be the western channel of the river where it flows between the islands of Melik (Uronarti) and Kajinjera on the east and Jebel Barka on the west. Next below comes a range of mountains crossing the river. The name of the east end, Mons Cubitalaua, provides the clue to the identification; it is the hill on the west bank below Aswan called Kubbat al Hawa (Windy Tombs). Mons Gof at the other end may be the Coptic monastery of St. Simeon, a mile away. These identifications I submitted to Professor Monneret de Villard, who excavated the monastery, and he accepts them. They were suggested by the map in Baedeker. Mons Singua seems to be aiming at Suakin on the same latitude, and may be derived from Sinkat, the highest point on the Suakin–Berber route. Immediately below is the first cataract, though Aswan, called Sua, is marked a little too far north.

Fra Mauro did not regard the Abaui as the Nile, whose triple sources are marked at the head of the Tagas (Tacaze). Here we are back on firm ground, for the provinces named are all certainly identifiable—Bagamidie (Begameder), Simi (Semien), Saleth (Tzellemti), Bugina (Bugna) and Duag[e?], probably for D'Uag[e?], (Vag). Urguer is the Vrvvar of Zorzi, where Lalivela was buried, and is the district in which lies Roha or Lalibela, celebrated for its rock-cut churches. The Tagas has on the west the Mana (Menna) and on the east the Late (Tsellari, rising near Lat, south of Lake Ashangi). The range of mountains in which are the sources of the Nile is called Çiebelchamir, and in his remarks inserted close by, Fra Mauro states specifically that "the Nile rises in the provinces of Marora and Salgu, and flows by the side (*costiera*) of a very high mountain called Marora or Chamir."

[1] Ed. Evatts, p. 273.

[2] Narrative, 1823, p. 73.

Now Marora (of which he also gives an alternative spelling Meroa) is the place south of Lake Ashangi still called Maraua on the maps; north and south of it rise the head-streams of the Tsellari, and a little farther south is the projecting range that divides the Tsellari from the Tacaze. The highest point of this range is Mount Abuna Josef (4190 metres=13,743 feet). Across the range is written on the 1/2 Million map the word Kamir, denoting the habitat of the Kamir Agaus, an indigenous pre-Semitic people. Thus Fra Mauro's Çiebelchamir is precisely located on both his own and on external evidence. Now Çiebelchamir is simply the Arabic Jebel Gamr, mountain of the moon; and I submit that we have here the explanation of the origin of that ancient myth which placed the sources of the Nile in the Mountains of the Moon. The myth itself goes back to classical times, even if we accept M. Simar's view [1] that the relevant passage in Ptolemy is a later insertion. I would explain its origin somewhat on these lines: At some early date travellers brought back a report that the Nile rose in some mountains called Chamir. They may not themselves have spoken a Semitic language in which the word for "moon" was either "gamr" or some cognate word; but the word was so interpreted by Semitic-speakers in the eastern Mediterranean lands.

It may be objected that Fra Mauro might have taken the name Çiebelchamir from Idrisi (whose map marks Gebel Kamar as the source of the three branches of the southern Nile), or from one of the other European maps such as the Genoese planisphere of 1457 (*montes luna qui lingua Egyptiaca dicuntur gibelcan*) or the fifteenth-century planisphere of Este (Gibelcamar). The fact that the word "Abassia" written immediately above bears the annotation "This Abassia is called Agisimba by the cosmographers" shows that he was consciously identifying ancient names. His text makes it clear that he knew the meaning of the first word and that "Chamir," not Çiebel, was the actual name. But the very fact that he speaks of a "mountain called Chamir or Marora" seems to suggest that he regarded the names as *local* appellations. He may perhaps have been doing exactly what I am doing now—explaining an old myth by means of a recorded topographical name. The name Chamir as applied locally seems to be on record at least a century before his time, if Rossini's identification of Dimasqi's Khumid (=Khumir), one of the tribes of Abyssinia, with the Chamir Agaus is correct.[2] I cannot believe that Fra Mauro's location of Çiebelchamir in the one place where that name does actually occur can be merely a coincidence.

However this may be, I feel quite convinced of the futility of all attempts to identify the Mountains of the Moon with Ruwenzori, Kilimanjaro or Kenya, and of Ptolemy's lakes with the adjacent equatorial ones. Ptolemy's latitudes can be proved to be quite fictitious here, for he puts the mouth of the Atbara far to the south of his Daron; and we know that Daron was upstream from the mouth of the Atbara because Aizanas, who was then camped there, says so in an inscription recording the conquest of Daro. These latitudes are the sole basis of all attempts to put the Mountains of the Moon on or

[1] *La Revue Congolaise*, vol. 3 (1912) 95. But see discussion p. 25.

[2] *Bull. Soc. Geogr. Ital.*, fasc. ix–x (1917) 676, quoting Mehren, "Manuel de la Cosmographie du Moyen-Age," p. 389.

near the equator. The fact is that Central Africa south of about lat. 10° and west of the Blue Nile was an almost completely unknown land right down to the end of the eighteenth century. Nero's soldiers seem certainly to have reached the *sudd* region, but I believe they got there from the Blue Nile somewhere near Sennar, not by travelling up the White Nile. They may have initiated the idea of the *paludes Nili* as its source. Ptolemy's lakes were, I am sure, in Abyssinia, Tana being one and Ashangi probably the other. It is with these lakes that the Mountains of Moon are associated, in the Ptolemaic tradition, as the source of the Nile. When the outline of the Continent had been fixed (with remarkable accuracy) by Portuguese circumnavigation, the vast empty spaces were filled (as we shall see) by multiplications of Lake Tana, thus giving fresh life to the erroneous latitudes of Ptolemy. When equatorial lakes were found actually to exist, they were identified with those of Ptolemy; but the reasoning is fallacious.

There is no space to discuss Fra Mauro's map in greater detail, and I hope to do so on another occasion. This paper is designed partly as a preliminary skirmish, to test the validity of some of the ideas propounded; those which fail to pass the test can be eliminated before they obtain wider currency. There are, however, two more aspects of the map to which I must refer briefly. One is the roads. You will see that the Great Ridgeway runs from Barara in the south to Maria in Eritrea; it is for part of its course the route still used. Its course is known pretty accurately, not only because many of the places on it can be identified, but also from itineraries of the fifteenth century. The other roads are more difficult, but their identity may perhaps be established by a study of the Zorzi itineraries.

The other aspect is the western part of the map, which is a subject in itself. The geography is hopelessly confused, but many of the names are identifiable. The marshes (paludes) on the watershed certainly represent Lake Chad. Chuchuben and Chuchugaraga must be two of the many places called Kuku, one of which is on the western shores of Lake Chad. Bolala is Bulala, the region east of Chad round Lake Fitri. The Bulala were a people called Kai-Bulala in a Bornu manuscript relating to the year A.D. 1176. They occupied a country called Kabila near the well of Kabar identified by Newbold [1] with Teigo (lat. 25° 30′; long. 17° 30′). Tombatu is of course Timbuctoo. Bargemi is Bagermi, a region on the river Shari, south-east of Chad; and Abussara may be Bua Sara on its upper waters. Torso must surely be Tarso, the highest peak in Tibesti; and Meçecha may be Muska also in Tibesti, possibly Ptolemy's Mons Mescha. Setera in the north is the oasis of Siwa, whose medieval name was Santariya.

I had intended to discuss somewhat fully a map of Abyssinia which is based upon actual survey, that accompanying Almeida's History, but space allows only the briefest mention. There are two copies, apparently by the same hand, bearing the date 1662. One is bound up with the manuscript of Almeida's History in the British Museum; the other, a much better copy, is in the Marsden collection at the School of Oriental and African Studies, and I am indebted to the Librarian of that School and to Dr. D. S. Rice for much

[1] *Sudan Notes and Records*, vii, p. 34.

help in obtaining a photostat of it and in other ways.[1] The map summarizes the knowledge obtained by Portuguese missionaries up to the date of their expulsion after 1632. The upper course of the Abai is shown correctly, along with several of its tributaries; but it is made to curve round and flow parallel with an independent Tacaze and with the Red Sea coast. On the lower Tacaze are marked the Funchos and Ballous, the former representing the Fung kingdom of Sennar on the Blue Nile, and the latter an important Eritrean tribe that was confused and equated with them by the Portuguese. The kingdom of Deqhim is probably the Gash delta below Kassala. Serra Lasta is Fra Mauro's Çiebelchamir. In the south there is a marked improvement in the course of the Hawash (called Aoaxé), although one branch is wrongly derived from Zoay (Lake Zwai, south of Addis Ababa). This branch is called Machy and is the river still so called which in fact flows into and not out of the lake. On the south-west are the rivers Anquer and Maleg, the former the Angur, a tributary of the Dadessa, which is the Maleg of our map. The Maleg joins the Nile below Fascolo (Fazughli).

The map, taken with contemporary Portuguese literary sources, reveals an intimate and fairly accurate knowledge of Abyssinian topography, and for the first time an awareness of the existence of a region to the west. Although Sennar is not marked on the map, it was known to the Portuguese missionaries who mention it often. (In 1640 one of them, while waiting at Suakin for an opportunity of entering Abyssinia, made a cushion and sent it to the king of the Fungi by the hand of a Maronite merchant.)[2] Sennar had been visited and its existence recorded for the first time by Reubeni in 1522; but his narrative remained unpublished until the mid-nineteenth century. At the same time Alvarez had given some account of it at second hand, under the name of Nubia, but he was chiefly concerned with its religion, and he mentions no place-names. Paez (*d.* 1622) mentions Berber and the Atbara. But without astronomical control none of these travellers could realize the vast extent of the region between Egypt and Fazughli. Perhaps the compiler of the Almeida map had some dim conception of its vastness, for he refrains from inserting Aswan. To that extent (and of course in other respects) the map is an advance on Fra Mauro's.

The story concludes with the printed maps of Africa. There are of course very many of them, and I have not been able to study more than a few, from which I have selected those most easily accessible, some of them having been reproduced in facsimile in our former secretary's most valuable book:[3] Livio Sanutò, 1588; Pigafetta, 1591; Jacob van Meurs, 1668; and Moll, 1710. For my present purpose the exact pedigree of these maps is of secondary importance, and I have not attempted to trace it. What I have done is to examine the names in order to find out what actual existing geographical features gave rise to them. These names consist of provinces or kingdoms and villages (the two being often confused), lakes, mountains and rivers. The

[1] See Sir E. Denison Ross in *Bulletin of the School of Oriental Studies*, ii (1921–31) p. 513 ff.

[2] Teodosio Somigli, "Etiopia Francescana," Florence, 1928, Vol. 1, p. 127.

[3] J. Scott Keltie, "The Partition of Africa" (1895).

easiest feature to analyse is the lakes; and they may be identified partly by the names they are given and partly by the names of the places marked in their immediate neighbourhood. The result is surprising; all the lakes on all four maps are resolved into two—Lake Chad and Lake Tana. The latter is given no less than five different names—Barcena, Zaflan, Zaire, Zembre, and Sachaf. Barcena comes from Barros and is simply the Abyssinian hybrid-word Bahr-Sana, the lake of Tsana. Zaflan is not a place-name at

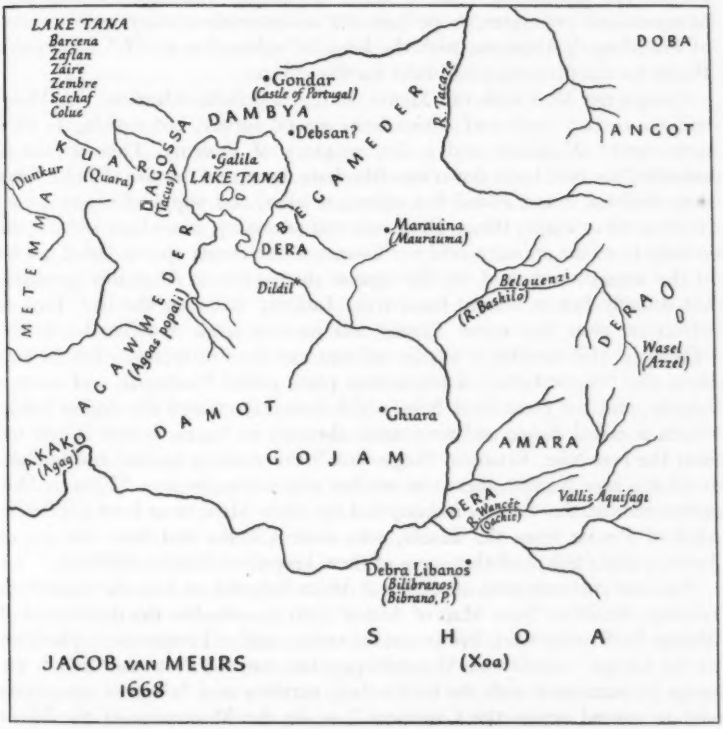



*Fig. 5. The location of Jacob van Meurs' place names*

all but a title of rank[1]; its identity with Tana is proved by the names Xoa (Shoa) and Vallis Aquifagi (the Aquiafagi of Alvarez) on its shores. Zaire is an alternative name of the river Congo; the other name, Zembre, given to the southern half of the same lake is simply that of the province of Dambya, from which Lake Tana got one of its names, Bahr Dambya (in Portuguese, Mar de Dambya). Sachaf, south of Zembre-Zaire, also denotes Tana, as is revealed by the names Bagametro (Begameder), Gallila (name of an island in Lake Tana) and the significant Doldel (Dildil, the Abai bridge).

[1] The ruler of Shoa was called *Sahafa Lam;* the name Sachaf is also so derived. See Pereira, 'Chronica de Susenyos' (1900) p. 211.

The doublets of Chad—named Guarde, Borno, Niger lacus—can similarly be proved to be no more than such.

There is no time to trace the origin of the other names. A region called Ambiancantiva is simply Dambian Cantiva, the province of Dambya, with the initial "D" mistaken for a possessive pronoun and lopped off. The Castle of Portugal, which is placed on lat. 20° S. near the site of Bulawayo, is of course Gondar, where the seventeenth-century castle still stands. The kingdom of Biafara, in which a rather elephantine rhinoceros is suckling a horny-coated youngster, is perhaps the seventeenth-century representative of Fra Mauro's Abussara, with the long "s" misread as an "f." Moll writes Biasar for the province and Biafar for the village.

Comparing Moll with van Meurs we find a definite advance. Van Meurs had the correct outline of Africa from coastal survey, but nothing to fill it with except Abyssinia and a dim memory of Ptolemy. Thus armed he extended the Nile basin down into Rhodesia, increased the size of Lake Tana, then doubled it and added five others, smaller, and supplied the necessary rivers to fill or empty them. Even so it was necessary, as we have seen, to call in help from the animal world to fill some of the empty spaces. Moll got rid of the animals and used the Portuguese discoveries in Abyssinia (probably not directly but at second hand from Ludolf). Between the real Tana to which he gives the name Tzana) and its two large doublets he writes: "Ethiopia: this country is wholly unknown to the Europeans." But he puts there the "Nigar Lake," a mysterious place called Maitagazi, and another Legula; and the great river Nile, which formerly crossed the region northwards is called Zebée and terminates abruptly in Narea, before it gets too near the real Nile. Between "Negroland" (the western Sudan) and Guinea, in what is now Nigeria, there was another void where, he says, "I am credibly informed that the country is inhabited by white Men, or at least a different kind of People from the Blacks, who wear Cloaths and have the use of Letters, make Silk, and that some of them keep the Christian Sabbath."

The last enchantments of medieval Africa lingered on into the nineteenth century. Smith's "New Map of Africa" (1815) embodies the discoveries of Mungo Park in the west, Browne in the centre, and of Portuguese exploration in the Congo, Angola and Mozambique; but our old Ptolemaic friend, the range of mountains with the bird's-claw, survives as a "chain of mountains said to extend across the Continent," as do the Mountains of the Moon (Gebel el Kumri) whence issues "the most remote source of the Nile." Biafra has moved down to the coast near Old Calabar. The Sabbath-keeping white men are replaced by the Mountains of Kong (said to abound in gold). Chad's western doublet has become the "Sea of Soudan." Pigafetta's rivers of Bancare and Wambe now rise in the mysterious region of Funjeno, and uniting with the Zahir at Concobella flow southwards to the Atlantic between Pombo and Congo. They have surpassed the ambition of the aspiring soul in Robert Montgomery's celebrated poem, having mounted to their source, crossed the watershed and gone down the other side. Originally they were members of a party of six which, on Livio Sanuto's map (1588) rose in the kingdom of Manicongum and ran into a nameless lake. Between them and their four companions (Cuyla, Bibus, Maria-maria and Zanculus) went the

Zaire, flowing westwards from the lake to the sea. Pigafetta introduced some improvements; he created a new and smaller lake which he called Lago Aque Luna and rearranged the rivers, making the Wamba flow between the Abyssinian provinces of Goyame and Vangue to the Congo, and the Bancare through the region of Pangueinungos past the Glass Ranges (Serras de Cristal).

These are not imaginary names. The Wamba rises in the Lunda [1] district of Angola and joins the Kasai seventy miles above its confluence with the Congo. The Cuyla is probably the Kouilou near Loango. What is imaginary is the admixture on the earlier maps of other names belonging properly to Abyssinia, such, for instance, as Goiame, Damute, Agag, Bagametro, Debsan, Matama. More or less imaginary, also, are the Ptolemaic echoes (Agisimbi, Olabi, Lunae Montes) which were anachronisms on maps of the sixteenth and seventeenth centuries. The explanation seems to be simple. The earlier maps of Africa were truncated southwards and compressed centrally because the cartographers had no idea of the true size and shape of the Continent. When this was revealed by maritime exploration, they were suddenly confronted with a vast area to which all existing information had somehow to conform. Unlike explorers, cartographers dislike great open spaces and we all dislike an admission of ignorance. I am sure that the Right Honourable Charles, Earl of Peterborow and Monmouth, etc., would have considered himself defrauded if his most humble servant H. Moll had actually inserted on his map only the "newest and most exact observations," for then there would have been almost nothing shown except the coast-line and an isolated fragment in Abyssinia. But cartographers are artists and patrons must be appeased. Moll's map is a poor effort as a work of art, but those of van Meurs and Fra Mauro are aesthetically satisfying. I have spent many hours of enjoyment contemplating both of them in facsimile; and I know I should have enjoyed them less if they had been as ill drawn and ugly as some modern maps of Africa. The best maps are those which combine truth with beauty, and no better examples can be found than those which appear in each number of the *Geographical Journal*. The latest of such is none the worse, I think, because the draughtsman has resisted the temptation to fill the Rub al Khali with imaginary portraits of the neighbouring potentates.

Perhaps I am wandering rather far from the subject of this paper. I would however remind you that it professes to deal with theories, amongst them some of my own. On such an occasion as this it is legitimate to air one's theories before they have hardened; and it is especially necessary when one is a newcomer in a well-trodden field, as I am. If, through unfamiliarity, I have overlooked important sources, I hope those who take part in the discussion will say so. May I, in conclusion, thank those who have assisted in the work of preparing it, and may I particularly thank Professor E. G. R. Taylor for calling my attention to Egyptus Novelo which was the beginning of the whole matter.

[1] Pigafetta's 'Aqui Luna' and Moll's 'Mt. of Sunda' ("L" read as "S").

## DISCUSSION

Before the paper the CHAIRMAN (Dr. E. LYNAM) said: There is no need for me to introduce to you Mr. O. G. S. Crawford. The older among you have followed his career since 1912 when he sent to the Society's *Journal* two remarkable and original contributions on Bronze Age Antiquities. Since then he has been closely associated not only with this Society but with every geographical society in Europe and the United States. In 1940 we gave him—and it was the least we could do—the Victoria Medal of the Royal Geographical Society. I have followed Mr. Crawford's work with great interest because in practically everything he has done there is originality, versatility and thoroughness. He founded that well-known journal *Antiquity* which we can all remember since 1927. In *Antiquity* we find papers not only on archaeology and cartography but on history and other subjects of interest to the academic world. Mr. Crawford has been also among other things a member of the Historical Commission on Ancient Monuments. He has recently completed a book on the topography of Roman Scotland. That is an example of his versatility. Mr. Crawford now comes back to Fra Mauro and Egyptus Novelo on which he is to lecture to us this afternoon. It gives me great pleasure to call on Mr. Crawford, a Fellow of our Society, to address us.

*Mr. Crawford then delivered the lecture printed above, and a discussion followed.*

The CHAIRMAN: You will agree, ladies and gentlemen, that Mr. Crawford has covered a very wide range and I feel sure many of you are desirous of discussing his paper. Perhaps Mr. Letts will speak now?

Mr. MALCOLM LETTS: I confess that I have been very badly shaken; Mr. Crawford has blown me sky-high, together with a whole company of medieval travellers. I always thought the Mountains of the Moon were to be identified with the Ruwenzori range, and I am supported in that because a traveller of the late fifteenth century claims not only to have been there but to have climbed the range. It is unfortunate, perhaps, that when he climbed the Mountains of the Moon he claimed to have done so in three days, and also that he then travelled from what must have been lake Victoria Nyanza down the Nile to Cairo in fifty-five days! Nevertheless, the story is a good one, though it must be accepted with a grain of salt.

The myths associated with the Mountains of the Moon are very interesting and perhaps I might venture to mention one. The Spanish traveller, Pero Tafur, on his way back from Mt. Sinai to Cairo in 1436, met the famous Italian traveller, Nicolo de' Conti, who had just returned from the East and was on his way home to Italy. De' Conti regaled the Spanish traveller, Tafur, with all kinds of delightful stories, including one recording that Prester John had sent out an embassy to discover the source of the Nile. It must have been a difficult expedition to organize because it was necessary to produce a race of men who could live on fish. Prester John therefore collected a crèche of babies, deprived them of milk, and brought them up on raw fish. As soon as they were fully grown he sent them out on the expedition. When these young men reached the source of the Nile and the Mountains of the Moon they looked up and saw the Nile pouring out of a hole in the rocks. They sent up scouts to investigate, but some of them refused to come down again, and those that did come down refused to say what they had seen, and the whole expedition ended in failure. I cannot help thinking that Nicolo de' Conti must have spent his time in the monastery at Mt. Sinai not in adoring the relics of the Saint, but in the library reading the 'Travels' of Sir John Mandeville, because Mandeville has very much the same story to tell in connection with the Earthly Paradise.

But, as I have said, I have received a severe shock, and I hope you will forgive my saying anything more except that I want to go into a quiet corner, recover my senses, and ponder on what Mr. Crawford has told us so ably.

Mr. J. W. CROWFOOT: I only rise because the Chairman has called upon me, not because I have anything to add to what Mr. Crawford has said. I imagine he must have ransacked most of the published literature to be found in the west of Europe. For any further light we must hope to get something more from the east; possibly when all the libraries in Constantinople have been explored we may get more information in regard to medieval conceptions of Africa. Most of the Arabic geographers of whom we know do not carry us very far.

Mr. Crawford has produced a marvellous account of these medieval maps which have puzzled one for a very long time. One of the troubles in a part of the world I know well, the Anglo-Egyptian Sudan, is that one can find ancient sites to suit almost any place. Mr. Crawford pointed out one or two places, and I think he was probably right in his surmises, but there are so many sites, that are certainly of a medieval period on the Nile, about the fourth cataract below Khartoum that it is difficult always to be certain.

I express again my admiration for the work which Mr. Crawford has done in throwing light on these dark places.

Mr. R. A. SKELTON: I wish to add one small footnote to Mr. Crawford's witty account of the dilemma of the eighteenth-century cartographer confronted with the large unsurveyed regions of Central Africa. The blank spaces appeared suddenly; it was not a gradual process. About 1727 d'Anville passed a sponge over the centre of the map of Africa and wiped out the text; he then restored those names for which authority existed, but refused to put back the rest. D'Anville's representation of Abyssinia is derived from Ludolf's map of 1683. Ludolf's map in turn owed its outline to the engraving of Almeida's map made for Fr. Baltasar Telles's history of Ethiopia published in 1660. This gives a date for Almeida's map, to which Mr. Crawford referred, a little earlier than 1662. The British Museum MS. of this map has hitherto been considered unique, and it is interesting to learn that another contemporary copy exists in the School of Oriental Studies.

Mr. Crawford referred also to the inability to fix positions which accounted for the displacement southwards of so many Abyssinian features. On the British Museum copy of Almeida's map latitudes are marked and these were copied faithfully by Ludolf who asserts that the Jesuits used the astrolabe in determining positions. The Tellez map shows both latitudes and longitudes.

I think the first historian to suggest Ptolemy's passage about the Mountains of the Moon to be an interpolation was an early Vice-President of this Society, Mr. Desborough Cooley.

Professor E. G. R. TAYLOR: As Mr. Crawford said, I drew attention to the earliest map of which he made use, which came in with some photographic copies sent to the Royal Geographical Society some twenty or more years ago. I then tried to start a discussion on this fascinating topic by myself attempting a few identifications and sending the list to the Editor of the *Geographical Journal*, thinking they might interest others and encourage those better able than myself to take up the subject. I received a letter from the then Librarian of the Society saying that the then editor did not like to see lists in the *Journal*, and so the matter dropped.

A point among many others of interest this afternoon was the identification and discussion of the Mountains of the Moon. It occurred to me that the reason

for dragging the Mountains of the Moon down to the Equator, as they are seen on Ptolemy's map, was possibly because in classical times there was the suggestion that the actual equatorial part of the globe was temperate instead of being torrid in climate, and was temperate because it was elevated. This bears out a point which has emerged incidentally from what Mr. Crawford has said—the way in which ideas rather than exploration have influenced cartography; and also the point that an idea associated with the Mountains of the Moon was that they were so lofty that they reached up to the circle of the Moon. That leads to a further association of ideas. One of the problems in medieval thought was in regard to the Earthly Paradise: how did it escape the Flood? Obviously it escaped the Flood if it was high up, as high as the circle of the Moon. Therefore one sometimes finds—and Mr. Crawford must know such maps—that the Earthly Paradise is placed not where it usually is, in Eastern Asia, but in some part of Africa and particularly in Abyssinia, where he has identified (and I at any rate have a strong feeling that it is correct) the lakes and the Mountains of the Moon in which the Nile rises.

There is another small point. You will remember that Mr. Crawford drew our attention to the fact of rivers of two distinct systems being linked together and crossing a watershed. The idea of the relation of the flow of rivers to the topography seems to have been absent right down to the seventeenth century, and that is not always realized because we ourselves take it for granted that rivers are related to rainfall and that the rain runs off downhill. It was not until Halley read his classical paper on hydrography late in the seventeenth century that it was established that rivers are related to rainfall and do not gush up out of the "veins of the earth."

At this late hour we must not permit ourselves to go into the matter further. Rather we must wrap a wet towel round our heads, sit down with Mr. Crawford's paper before us and try to get at the details of the identifications he has suggested. We should hesitate to negative the efforts of the early explorers and early cartographers and say they knew nothing about this or that. A map may seem all nonsense until we put a microscope over it, as Mr. Crawford has over the maps of Abyssinia; then we see the actual explanation and realize that knowledge does lie behind it. I wish I could have said something about Herman Moll, but that's quite another subject, though I could tell you a few things about young Moll.

I close by thanking Mr. Crawford on my own and on your behalf for opening up to us a most fascinating subject.

The CHAIRMAN: The secret of this is that Mr. Crawford has it all in his hands. A long time ago he went out to the Sudan and excavated as an archaeologist. He has developed a remarkable talent for utilizing maps for the study of archaeology and history. He used those methods so ably and ingeniously that as a result he was appointed to a post which had not previously existed, namely, Archaeological Officer to the Ordnance Survey. In that post he immediately showed what could be done with maps in the classification of archaeology and history. Then he became one of our great pioneers in air survey. It was he who first showed how easily features, such as cultivation banks, which cannot be seen by the naked eye when one is walking over the land, can be photographed and made quite visible by air photography. His first three books on air photography and survey from the air really mark an epoch in our study of archaeology. You will have gathered what a master Mr. Crawford is, and you will have realized that he can make the most of maps in order to extract the truth from them. I feel sure you will all join in thanking him very sincerely for his lecture.

Mr. O. G. S. CRAWFORD: I thank you very much, ladies and gentlemen, for the way in which you have received my somewhat speculative paper.

As regards the earthly paradise, some of the fourteenth and fifteenth century maps show that one source of the Nile is a tributary which comes in from the south; it is called Gion and it was said that it descended from *paradiso terreno*, so that the earthly paradise is located in Abyssinia. I should like very much to hear Professor Taylor's story about Herman Moll some day.

I have no more to say except to thank you, Mr. Chairman, and those who have taken part in the discussion. Mr. Skelton is a little more fortunate than I in having easy access to so many of the maps. It is difficult for a country dweller to get a sight of them. I hope later to go into the whole of this question in more detail.

*Further written contributions to the discussion were received:*

Mr. BECKINGHAM writes: It may be of interest to mention that in the Middle Ages information about Abyssinia was accessible in several places well known to the European traveller. In Jerusalem there was a small Abyssinian community whose history Professor Cerulli has recently published, while the Coptic Patriarchs in Egypt maintained relations with the Abyssinian Church whose head or Abuna they appointed. Mr. Letts has referred to Arnold von Harff, the German traveller who claimed to have ascended the Mountains of the Moon. It is obvious that von Harff did not go to Abyssinia and he records nothing of topographical interest about that country, but some of his remarks about religious practices are correct. He spent some time in Cairo and it was evidently there that he obtained his information about the Abyssinian Church, for the specimen alphabet which he records as Ethiopic is, in fact, Coptic.

Mr. TRACY PHILIPPS writes: On March 14 Mr. O. G. S. Crawford addressed the Society, most interestingly, on "Some Medieval Theories about the Nile Basin" and the origin of the story of sources of the Nile in alleged Mountains of the Moon which he declared to be in Abyssinia, north of 10° N. and not far off the latitude of Aden. Mr. Crawford made a good case and did not suffer gladly those of this generation who, from pre-medieval references, have questioned whether the *Montes Lunae* were not snow-capped mountains in the Nile Basin on the equator. Of such mountains, there was and is only one. I have no issue to take up with Mr. Crawford, but it is not without interest to glance at some of the main references which have probably lain at the back of those who have, quite vocally, taken another view. Like Mr. Crawford, I am not concerned with *the* source of the Nile, but with the origins of *the story* of a Nile-source near snow and mountains "of the Moon." Indeed the idea of mountain-*snow*, which did not, and does not, exist in recorded history in the lands of the αἴθος-ὄψ (burnt face) Ethiopians or of the Abyssinians (*Habash*, land of confusion or disorder), is the silver thread which, whether accepted or not, runs through the most serious of the classical allusions to the sources of "the river of Egypt." Aeschylus (525 to 456 B.C.) was a serving soldier in the wars of defence of the most enlightened part of Europe against the aggressions of a west-Asian slave-state. Widely read and founder of Greek drama, Aeschylus writes of "Egypt nurtured by the *snow*."

Herodotus, the much-travelled and well-read Father of History, was born a colonial and had travelled observantly in Persia, Russia (Scythia), and in Egypt (up to Assuan) after 460 B.C. He was in Athens about 445 and, writing about 457, he reports that Hellenic Egyptians explained to him, though he could not credit it, that "the Nile flows from where *snow* melts" (τὸν Νεῖλον ῥέειν ἀπὸ τηκομένης χίονος). Herodotus' recording of the Cyrenaica-Libyans returning

from pilgrimage to the Saharan oasis and shrine of Amen (Ammon) where they would meet men from many lands, seems to show that Mediterranean contemporaries, like some medieval Arabic (and some nineteenth-century European) travellers had seen the Niger, at its hairpin-bend, flowing east towards the Nile which they thought it to be. Herodotus makes a curious comparison with the direction of flow at the hairpin-bend of the lower Danube which he appears to have seen. Aristotle, a thinker whose philosophy has influenced the world for two thousand years, was born a colonial in 384 B.C., the son of a physician by appointment to the court of the father of Philip of Macedon. Aristotle refers to a Nile-source as being from a "Silver Mountain," synonym for glistening-white. Ptolemy of Alexandria-of-Egypt, mathematician, astronomer and geographer lived until at least A.D. 141 and made contributions to pure mathematics and trigonometry which were not surpassed for 1400 years. In his famous Geography, he reflects the then-current opinion that at a certain latitude "there rise mountains 'of the Moon' whose *snows* feed the lakes, sources of the Nile." The Ruwennzóri, or Gambalágala ("glistening") Range, of 16,800 feet, on the equator, does in fact stand between the Great Lakes, Edward and Albert, and feeds the latter and the Nile from its eternal snows. It is probably from these classical references that there have, in this generation, been people who have permitted themselves to question whether the modern European's perception of Middle Africa may, as with America and Middle-China, have been only a re-discovery.

Tropical African Negroes appear, pre-medievally, early in the art of the riverain countries of the Eastern Mediterranean. Homer, *c.* 850 B.C., appears to have heard of the existence of tropical African pygmies (*πυγμαῖοι*) who killed night-flighting cranes tired at dawn or were killed by them on their annual south-bound migration (through tropical Africa).

Herodotus, *c.* 457 B.C., reports obliquely a westerly trans-Saharan adventure of five "proud and violent" youths from the Syrtis parts of Libya beyond Cyrene, perhaps by a route conjecturally ascribed to Cambyses (*c.* 525 B.C.), through the Fezzân oases and the Ahaggar massif, to a great east-flowing flood (containing crocodiles) such as is, at its bend, the river now called "Niger." The aim of the boys' high adventure was "to see what they might of the utmost range of travellers." From the Niger and its swamps, they brought back news of being met and escorted by "little men of stature smaller than common . . . and black" (*ἄνδρας μικρούς, μετρίων ἐλάσσονας ἀνδρῶν . . . χρῶμα δὲ μέλανας*). Herodotus, who made personal inquiries on the southern borders of Egypt, adds that, up the Nile beyond Egypt's southern frontier, the interior of Africa was known "for a distance of four months' travel." It would therefore appear that those, who for lack of decisive evidence have tried to keep an open mind, have wondered if they could exclude the possibility that occasional contacts with tropical Africans; through slave-markets or inter-tribal barter, or through travellers, adventurers or exiles; had relayed ideas of equatorial Nile-springs fed by snow to the searching curiosity of that widespread and lucid Hellenic world, ever seeking to hear or to tell of some new thing.

*Mr. Crawford replies as follows:*

Mr. Tracy Philipps' argument is based upon the continuity of a tradition, dating from Aeschylus and Herodotus, that the Nile rose in snow-mountains, and he argues that this must rule out Ethiopia, where "the idea of mountain-*snow* . . . did not, and does not, exist." But that is not so. Right at the beginning of the Christian era it was stated by a King of Ethiopia that the inhabitants of the province of Semien lived amongst snow mountains (*Σαμηνε . . . ἐν . . .*

χιονωδεσι ὀρεσιν οἰκουντες: Adulis inscription, copied by Cosmas Indicopleustes). The Semien mountains are not, of course, those in which the headwaters of the Tacaze rise, but they are only eighty miles to the north-west. Neither of us is concerned with the truth or falsity of the tradition; but that still remains to be established. Dufton, for instance, stated that in the month of April "my sight was now delighted by frequent views of the summits of the Simyen mountains, thickly covered with snow." [1] (The highest peak is that of Ras Dascian, called Anqua on the 1/M map, 15,154 feet, latitude 13° 15′.) I can therefore claim that, so far as the snow-mountain tradition goes, Ethiopia is not in any way disqualified. I agree entirely with Mr. Tracy Philipps in attaching importance to this line of argument, but I do not think it in any way weakens my case.

My date of 1662 for the Almeida map is taken from the British Museum copy, which is headed "Descricao do Emperio de Ethiopia, pello P$^{e}$ Manoel Dalmeida da Comp$^{a}$ de Jesus, Ann. MDCLXII."

Since giving the lecture I have seen the original of Egyptus Novelo and checked the names. Amongst those which are wholly or partly illegible on the facsimile are: Vabi, lacus dulcis (L. Zwai); Ghisen mons (Amba Geshen): Zolgo: Debat: Catataua: Toagitha: heremitarum monasteria (in Woldebba): Sere (Shire): Zagunagh: Za mons: rex Ca[n]tibe (Dambya).

[1] 'A journey through Abyssinia,' 1867, p. 196.

# THE GROWTH OF BRIGHTON

E. W. GILBERT

BRIGHTON IS ONE of England's thirty largest towns. Its growth as a seaside resort has been quite as startling in its rapidity as that of an industrial town. The creation of Brighton, moreover, is a peculiarly English contribution to urban life and as such deserves more attention from social geographers than it has hitherto received. At the census of 1931 the population within the boundaries of Brighton exceeded 147,000.[1] But it should be remembered that the built-up area of the County Borough continues westward without a break into the Municipal Borough of Hove and on into the two Urban Districts of Portslade-by-Sea and Southwick. These four administrative units, with a total population of 218,000 in 1931, together made up the eighteenth largest conurbation in Great Britain.[2] If the adjacent Urban District of Shoreham-by-Sea is also included, the five local authorities are now responsible for the welfare of a population of over a quarter of a million persons. A built-up area, which is geographically but not administratively *one* town, extends along eight miles of Sussex coast which lie east of the mouth of the Adur and is of the same order of size as the conurbations of Leicester (259,000) or Cardiff (241,000).[3] The Local Government Boundary Commission recently proposed to recognize the unity of the conurbation of Brighton by converting the several administrative areas which are in fact one town into the New County of Central Sussex.[4]

Brighton is not only a large town. It is also an attractive if not a beautiful place. Perhaps the epithet "elegant" suits it best, and while it is not possible to do justice to Brighton's elegance in this short article, it is worth quoting a few descriptions of the town by earlier admirers. William Cobbett, writing in 1832, described Brighton as "certainly surpassing in beauty all other towns in the world," and added that "Brighton is all beauty whether as to the streets, the buildings, the carriages, the horses, or the dresses of the people." [5] It is not therefore surprising that Jane Austen made Lydia Bennet imagine that "a visit to Brighton comprised every possibility of earthly happiness," especially as she was also led to believe that "the streets of that gay bathing-place were covered with officers." [6] Certainly "the long lines of princely houses that turret the cliffs" [7] of Brighton have always been, and still are, a very

[1] The Registrar-General's estimate of the population of Brighton was 154,800 as on 31 December 1948.

[2] C. B. Fawcett, "Distribution of the urban population in Great Britain, 1931," *Geogr. J.* 79 (1932) 100–16, see p. 110. Professor Fawcett showed that the conurbation of Brighton increased its population by 4·9 per cent. in the period 1921–31; that is, just about the national rate of increase (4·7).

[3] Figures from C. B. Fawcett, *op. cit.*, p. 110–12.

[4] *Geogr. J.* 111 (1948) 195.

[5] William Cobbett, 'Rural rides' (ed. G. D. H. Cole and M. Cole), 1930, vol. 2, p. 690.

[6] Jane Austen, 'Pride and prejudice,' 1813.

[7] Cuthbert Bede, 'Mattins and Mutton's; or the beauty of Brighton,' vol. 2, p. 283, 1866.

impressive sight. J. D. Parry in 1833 remarked that "the sea line of houses in Brighton now extends from the eastern extremity of Kemp Town, to the Adelaide-terrace, beyond the western esplanade, full three miles; a range of piles of buildings, alone to be equalled at St. Petersburgh." [1] Cuthbert Bede the author of 'The adventures of Mr. Verdant Green, an Oxford Freshman' (1853), in one of his lesser known works 'Mattins and Mutton's' provides a photographic description of Brighton from the visitor's point of view in the 'sixties. "England" he writes "can show no other spot where a continuous line of white houses, the greater number of which are of palatial appearance and dimensions, stretches for three miles along the sea-cliffs, and is backed up by a mass of streets and squares forming a town large enough for the habitation and requirements of more than eighty thousand residents, and more than one hundred thousand visitors. Brighton, in fact, is ten or twenty watering places rolled into one; it is London-super-mare, quite as much from its plethoric size as from its locality and patrons; and it is so much larger, grander, and gayer than all other sea-bathing resorts in Britain as to well deserve its title of their queen." [2] Perhaps the most remarkable tribute to Brighton was made by Li Shu-ch'ang, Secretary to the first Chinese Ambassador in London, who wrote of a visit to Brighton in 1877: "Since then, years have passed and I have visited famous places in many lands; but never on any day has Pu-lai-tun [Brighton] been absent from my thoughts, such power does this place hold over the affections of all who have beheld it." [3]

*Position and site of Brighton*

The facts of Brighton's geographical position are quite simple. The town is almost exactly 50 miles due south of London and is the capital's nearest point on the English Channel. The oldest part of Brighton lies at the extreme eastern end of the Sussex coastal plain and is immediately south of the South Downs. Only one mile east of the old town, the chalk of the Downs reaches the sea in cliffs.

Within the conurbation there are two distinct areas of relief (Plate 1). Part of Brighton itself, including its original nucleus, is built on the narrow eastern end of the Sussex plain where most of Hove, Portslade and Southwick as well as Worthing also lie. In contrast to the lower parts of the conurbation, much of modern Brighton extends over the spurs of the South Downs themselves and up the combes or valleys which deeply trench their southern slopes.

The most important physical features of the relief in the borough are two combes. One extends from Patcham to Preston and by way of St. Peter's Church and the Steine to the Aquarium, a distance of 4 to 5 miles; this combe is used by the main London road. The other runs from Falmer to North Moulsecoomb, Moulsecoomb and past St. Peter's Church to the Steine, a distance of 4 miles from the borough boundary to the sea; this combe is followed by the Brighton–Lewes road. These combes are now dry valleys, but in the London road combe a stream called the Wellsbourne used to rise

[1] J. D. Parry, 'An historical and descriptive account of the coast of Sussex,' p. 102, 1833.

[2] Bede, *op. cit.*, vol. 1, pp. 168–9.

[3] Osbert Sitwell and M. Barton, 'Brighton,' pp. 347–8, 1935.

north of Patcham. This intermittent stream is said not to have run since the winter of 1875 when the London road was impassable for 3 miles out of Brighton.[1] After the construction of the waterworks (on the western side of the railway, north-west of the Patcham tunnel) the bourne ceased to flow. In the combe followed by the Lewes road a bourne has flowed from time to time. In November 1876, water is said to have run like a river from the railway viaduct across the Lewes road above Moulsecoomb into Brighton and traffic between Falmer and Brighton had to be diverted.[2]

These two combes have steep sides and they separate three spurs of downland which come right into the modern town. On the west the ridge followed by the Dyke road is separated by the London road combe from the central north–to–south ridge. The latter is used by the Ditchling road which passes

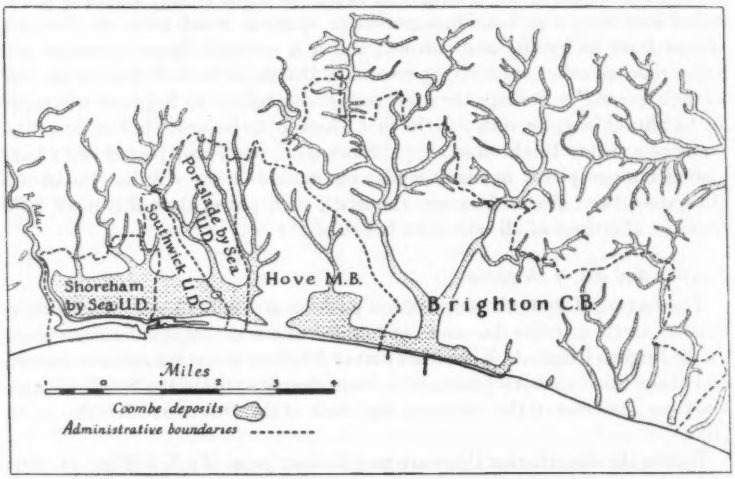



*Fig. 1. Distribution of Coombe deposits in the Brighton area*

Round Hill and Hollingbury (583 feet) on its northward course to Ditchling Beacon. The Lewes road combe divides the Ditchling Ridge from Race Hill (over 400 feet) and White Hawk, the downs which lie east of Brighton. The courses of the two combes and their branches are clearly shown by the distribution of the so-called Coombe deposits (roughly bedded chalk rubble and flints with a proportion of clay and sands). This deposit is also well developed on the coastal plain (Fig. 1).

Below the union of the two combes there is a considerable area of level ground (all of it beneath the 50-foot contour) which extends for about 1100 yards from St. Peter's church to the sea. It is roughly 400 yards wide. The original nucleus of Brighton, whose extent in 1779 is shown on Plate 4, must be considered in relation to this level ground. Its central part, now called the

[1] W. Whitaker, 'The water supply of Sussex' (supplement) *Mem. Geol. Surv.*, 1911, p. 241.
[2] *Ibid.*

Steine, was at times swampy. Early Brighton lay by the sea on the western side of the Steine on comparatively flat ground, all of it below the 100-foot contour, and just below the Dyke road ridge of the Downs. The old church of Brighton, that of St. Nicholas, stands at 158 feet above sea-level almost on this ridge and some 200 yards from the north-west corner of the original nucleus of the town. Plate 2 shows the town and its church from the eastern side of the Steine in 1765 when Brighton had only about 2000 inhabitants. From this nucleus (Plate 1) Brighton has gradually expanded as its suburbs have pushed higher and higher up the three downland spurs above the town. It has also crept steadily up the two combes and absorbed the old villages of Preston and Patcham in the process. A geologist, in describing the growth of Brighton's suburbs on the downland spurs, remarked that "the spectacle presented by their billowing acres of slated roof is by no means the least striking that the South Downs afford." [1]

Not only did expanding Brighton swarm up the converging combes and the low intervening spurs, but it was also able to spread westward along the Sussex coastal plain. Immediately to the west of Brighton, the narrow end of the coastal plain does not have the bad drainage and impermeability that mark it farther to the west. Here it is floored by the self-draining Coombe deposits (Fig. 1) and it offered a suitable site for the expansion of Brighton westward into Hove.

It is a mistake to consider that Brighthelmston, as Brighton was once called, was merely a poor fishing village before it became a watering place and health resort in the latter part of the eighteenth century. The earliest plan of Brighthelmston in 1514 shows that it could then be better described as a small town. This plan (Plate 3) is a picture of an attack on Brighton by the French,[2] and shows a series of parallel streets running north and south to the sea from North Street. On the hill behind the town St. Nicholas's Church can be recognized. A group of houses can be seen below the main town, virtually on the beach. The village of Hove with its one street and its church is included in the drawing and the low Coombe Rock cliff, on which is now the Marine Parade, is clearly shown. Towards the end of the sixteenth century Brighton was fortified with walls and gates, but by the end of the seventeenth century the town seems to have been reduced to a sorry plight. Defoe described Brighton in 1724-26 as a "poor fishing town, old built" and remarked that "the sea is very unkind to this town, and has by its continual encroachments, so gain'd upon them, that in a little time more they might reasonably expect it would eat up the whole town, above a hundred houses having been devoured by the water in a few years past." [3] The "lower town" on the beach had by then completely disappeared. Dr. Anthony Relhan stated

[1] H. J. Osborne White, 'The geology of the country near Brighton and Worthing,' p. 2, 1924.

[2] *Cotton MS.*, Aug. 1, i, 18. *See* James Gairdner, "On a contemporary drawing of the burning of Brighton in the time of Henry VIII," *R. Hist. Soc. Trans.*, 3rd ser., 1 (1907) 19–31. The date 1545 is marked on the map but Gairdner proved conclusively that the map represents events of the year 1514.

[3] Daniel Defoe, 'A tour thro' the whole island of Great Britain, 1724–6' (with introduction by G. D. H. Cole), vol. 1, pp. 129–130, 1927.

that in 1761 there were 300 fishermen, eleven vessels and fifty-seven fishing boats, and added that the fish were always sent to London as Brighthelmston "has the advantage of being its nearest fishing sea-coast." [1] Nearness to London which thus helped the fishing industry, was later one of the causes of Brighton's rapid growth as a resort.

The first detailed plan of the town, surveyed by Yeakell and Gardner in 1779 (Plate 4), shows the regular pattern of the streets more clearly than the picture map of 1514. The rectangular area of the town, some eighty acres in extent, is well brought out by this map. North Row (now Marlborough Place) was the only considerable group of buildings outside the rectangle. The main north–to–south streets, West Street, Middle Street, Ship Street, Black Lion Street and Great East Street are linked with North Street, the only east–to–west thoroughfare. Plate 6 is an aerial view of this old nucleus of modern Brighton. Yeakell's map also marks two roads to London from Brighton, the one by way of Lewes and the other past St. Nicholas's Church to Steyning and Horsham. Neither of these roads was direct; both of them entailed a journey considerably longer than the 50 miles which separate London from Brighton. The direct route by Cuckfield, Clayton and Patcham seems to have come into use at about the same time as the map was made. Up to 1779 the main approach to Brighton from London was by way of Lewes and the Falmer combe. The town was sufficiently important as a port to have a custom house which is marked in West Street on Yeakell's map. Brighton was a small town with some urban amenities and not a village when the great migration to the coast began. Before resorts were "planned" and developed by speculators, watering places could not rise out of mere hamlets or villages.

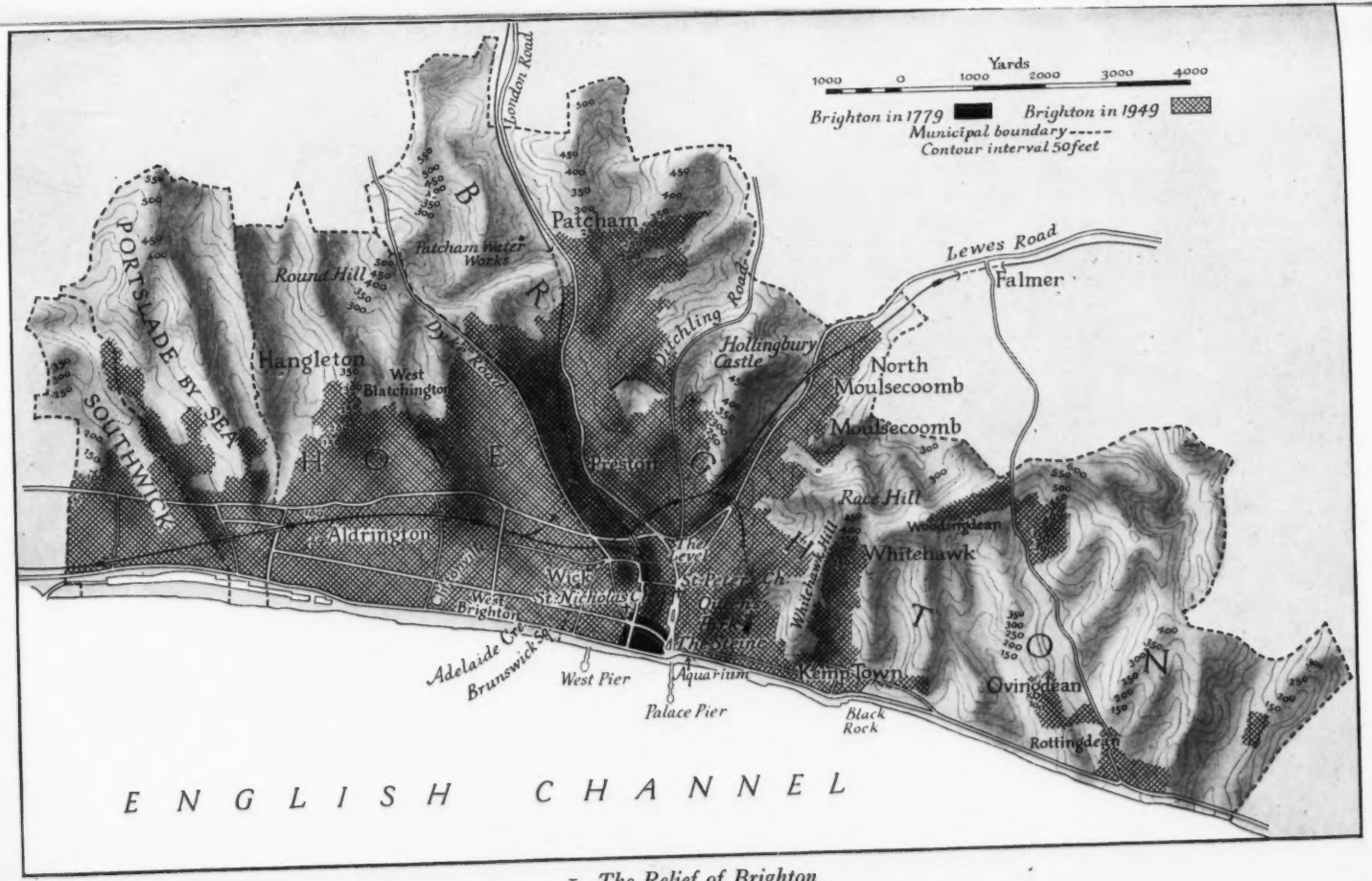
## CAUSES OF BRIGHTON'S GROWTH

### *The medical profession prescribes Brighton*

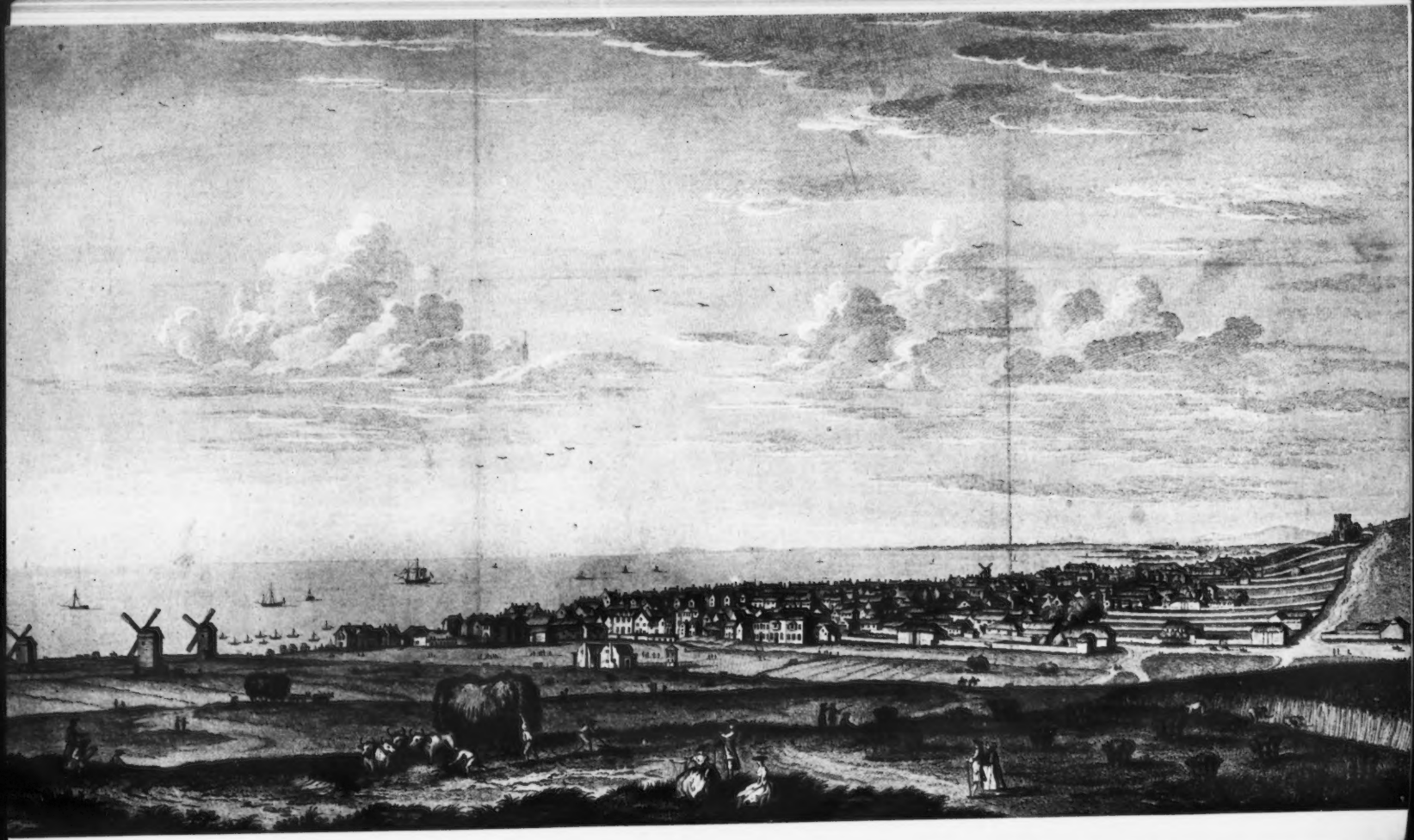
Brighton, which contained a population of about 2000 in 1760, had over 77,000 inhabitants in 1860. The causes of this rapid expansion within the course of a century are varied, but the first stimulus was certainly given by the medical profession. About the middle of the eighteenth century the Rush to the Sea began. Before then the sea coast had been shunned except by fisher-folk. People did not care to live near the sea, partly because it was supposed to be unhealthy, but also from fear of possible raids in time of war.

In the early eighteenth century invalids were sent by their doctors to drink the waters at inland spas, of which Bath and Tunbridge Wells were the most fashionable. Some patients were advised to try Scarborough, not for the sake of its sea air but to drink water from a spring which gushed from the cliffs south of the town. The idea of bathing in the sea for pleasure seems to have begun about 1730 at Scarborough when the town was already known for its spa, and the practice is recorded at Brighton as early as 1736. This new habit was recommended by Dr. Richard Russell as exceedingly beneficial for the health. Russell, born in 1687, set up his practice in Brighton in 1753 and

[1] A. Relhan, 'A short history of Brighthelmston, with remarks on its air, and an analysis of its waters,' p. 17, 1761.




*1. The Relief of Brighton*



built himself a house at the southern end of the Steine on the site now occupied by the Royal Albion Hotel. In 1750 he had published his famous book *De tabe glandulari sive de usu aquae marinae in morbis glandularum dissertatio*, which was translated into English in 1752 as 'Dissertation on the use of sea-water in the diseases of the glands.' Russell has been called the father of modern Brighton and he certainly had a great influence on the development of the town as a resort. The new treatment of sea-bathing, combined with the drinking of sea-water as advocated by Russell, brought an increasing throng of patients to Brighton. So it became necessary to build more and more houses to receive the visitors, and Brighton eventually rivalled Bath as a health resort.

The advantages of Brighton were stressed by other doctors besides Russell. Dr. Anthony Relhan laid emphasis on the health-giving properties of its soil and climate. "Chalky ground," he asserted, "has little or no perspiration, and therefore must be extremely healthy," and added that "in this soil there can be no marshy, swampy ground, excepting in such places as border on rivers." [1] The absence of a river was regarded as one of Brighton's most considerable medical advantages. Relhan notes that "as the nearest river to this town is really distant six miles, and as this is a circumstance peculiar to itself, no other maritime town in England being equally remote from one, I may venture to affirm that the soil is here extremely dry, and that the air of this place must be proportionately pure." Relhan also uses climatic arguments to explain "the singular healthfulness of the town of Brighthelmston" and assured his readers that as the town is "free from the insalutary vapour of stagnant water, distant from the noxious steams of perspiring trees, and every other cause aiding to produce a damp, putrid atmosphere, [it] seldom sees its inhabitants labouring under those disorders which arise from a relaxed fibre and a languid circulation." [2] Dr. Relhan also extolled the virtues of the Chalybeate spring known as St. Ann's Well which had been found at Wick, outside Brighton parish but only about half a mile west of St. Nicholas's Church (Fig. 2). This small spring issues from an outlier of the sands of the Woolwich and Reading beds and its waters had been prescribed by Dr. Richard Russell for some of his patients.[3] Dr. John Awsiter wrote a pamphlet in favour of the erection of a set of baths, similar in shape and size to those erected by the Duke of Kingston at Bath, so that bathing could be carried out in hot or cold sea-water and in all weathers. And he himself built the first Brighton baths at the Pool in 1769.[4] Many other baths were erected in later years,[5] the vapour baths built by Sake Deen Mahomed for his process of

[1] Relhan, *op. cit.*, pp. 2–3.

[2] *Ibid.*, p. 34. Dr. W. Kebbell in 'The climate of Brighton,' pp. 44–5, 1859, also considered that the absence of vegetation around Brighton was one of the causes of its healthful climate.

[3] Dr. Russell is said to have caused the spring "to be inclosed within a bason." C. Wright, 'The Brighton ambulator,' p. 144, 1818. A furnished pump room was later erected round the spring. This pleasant building with a colonnade supported by Ionic pillars was needlessly destroyed by Hove Corporation in 1935.

[4] John Awsiter, 'Thoughts on Brighthelmston, concerning sea-bathing and drinking sea-water with some directions for their use,' 1768.

[5] Dr. A. B. Granville described six bathing establishments at Brighton in 1841. See his 'Spas of England,' vol. 3, pp. 562–4, 1841.

2. *Brighthelmston from the east, 1765. By James Lambert*

*Courtesy Dudley W. J. North*

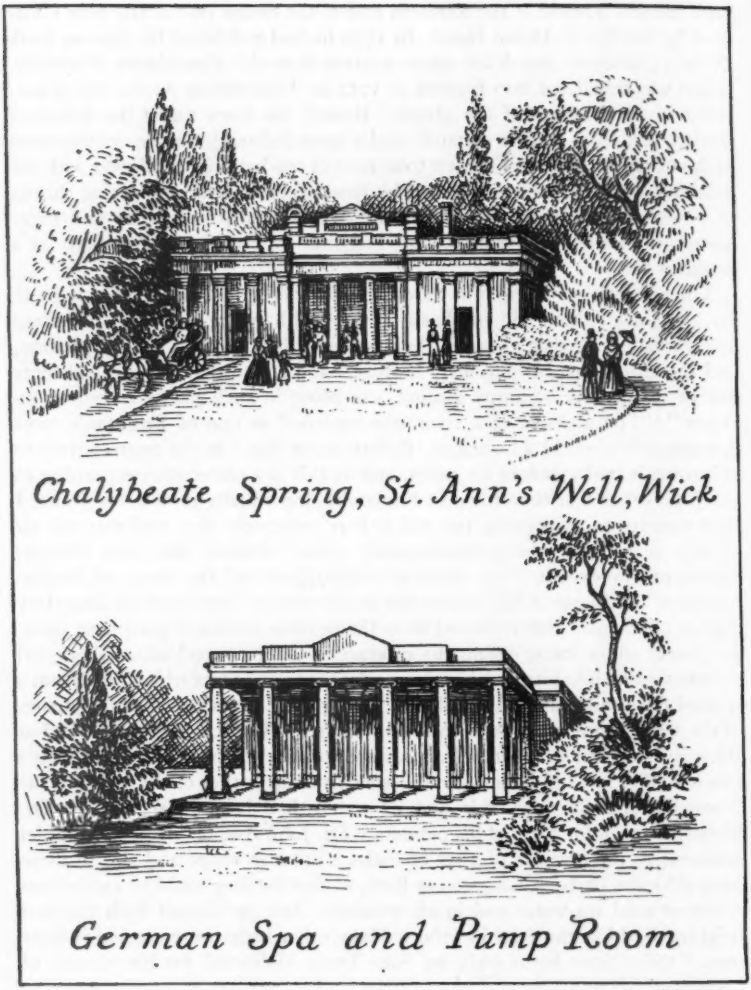



*Fig. 2. The Spas of Brighton*

"shampooing" being once the most famous. These lay where the Queen's Hotel now stands. Mahomed became Shampooing Surgeon to George IV and later to William IV, and the author of an 'Ode to Mahomed, the Brighton Shampooing Surgeon,' attributes the growth of Brighton to the Indian's reputation for curing diseases:[1]

[1] Quoted by S. D. Mahomed, 'Shampooing; or benefits resulting from the use of the Indian medicated vapour bath,' 2nd ed., p. 89, 1826.

While thus beneath thy flannel shades,
Fat dowagers and wrinkled maids
Re-bloom in adolescence.
I marvel not that friends tell friends,
And Brighton every day extends
Its circuses and crescents.

From either cliff, the East, the West,
The startled sea-gull quits her nest,
The spade her haunts unearthing,
For speculation plants his hod
On every foot of freehold sod
From Rottingdean to Worthing.

In 1843 Thomas Dugdale said that Brighton was furnished with "various suites of baths, comprising hot, cold, salt water, sulphuric, vapour, and air-pump water baths, deemed favourable for scorbutic patients" and that the town also possessed "the baths of Mahomet, where persons who have imbibed a taste for eastern indulgences, may enjoy the manipulation of shampooing." [1] 'Paterson's Roads' for 1826 gave a similar account of the baths and added that there were "numerous machines on the beach, for the use of those who prefer the rough embraces of Neptune to the more insipid attractions of artificial places of immersion." Thus, as a result of the work of the medical profession, visitors poured into Brighton to bathe in the sea or the baths, to drink waters from spring or sea, and to enjoy the salubrious climate.

*Royal patronage*

The doctors had started a movement which was strengthened by Royalty. The visitors who came in large numbers to take the cure and to taste the pleasures of Brighton soon included members of the Royal family. The Duke of Gloucester was the first of these Royal visitors; he made a short stay in 1765 and was followed by the Duke of York in 1766. Another of the King's brothers, the Duke of Cumberland, stayed for a week in 1771; he became a frequent visitor and rented Dr. Russell's old house. But the great event in the history of Brighton was the arrival, on 7 September 1783, of the Prince of Wales on a visit to his uncle the Duke of Cumberland. In the following year the Prince took Grove House on the Steine and began to pay regular visits to Brighton which did not finally end until 1827. The mere fact that the Prince had become a resident secured the prosperity of the town, as the world of fashion followed. A new house was erected for him and in July 1787 this Marine Pavilion, designed by Henry Holland, was ready for occupation. The building, which was continually being altered and enlarged, was finally completed between 1815 and 1820 by John Nash.[2] The Pavilion—half Indian, half Chinese—is a unique structure which gives a peculiar flavour and charm to modern Brighton (Plate 8). "What other buildings," asks Sir Osbert

[1] Thomas Dugdale, 'England and Wales delineated,' vol. 1, pp. 275–6, 1843.

[2] H. D. Roberts, 'A history of the Royal Pavilion, Brighton,' 1939, is the fullest account of the architectural history of the Pavilion.

Sitwell, "exist in England, or, as for that, in Europe, to compare with it, in individuality and exotic beauty?" [1]

Fame as a health resort and the building of the Royal Pavilion as a seaside residence for the Prince of Wales, afterwards George IV, were the main causes of Brighton's extraordinary expansion between 1760 and 1830. In 1832 Cobbett described Brighton as "a place of no trade; of no commerce at all; it has no harbour; it is no place of deposit or of transit for corn or for goods or for cattle." [2] Brighton was purely a resort for seekers after health or pleasure. In 1760 there were about 2000 inhabitants and the figure increased to over 7000 in 1801 and to 12,000 in 1811. Between 1811 and 1821, almost the years of the Regency, the population more than doubled and reached 24,429. In 1818 the summer visitors from June to October "are taken at 7000 additional residents between those periods; and from November to February at 2300; and from February to June at 1700." [3] To accommodate these new residents and visitors more and more houses had to be erected. In 1770 there were about 600 houses; the figure had risen to 1282 in 1801 and to 2077 in 1811. Between 1811 and 1821 the number of houses nearly doubled and reached 3947.

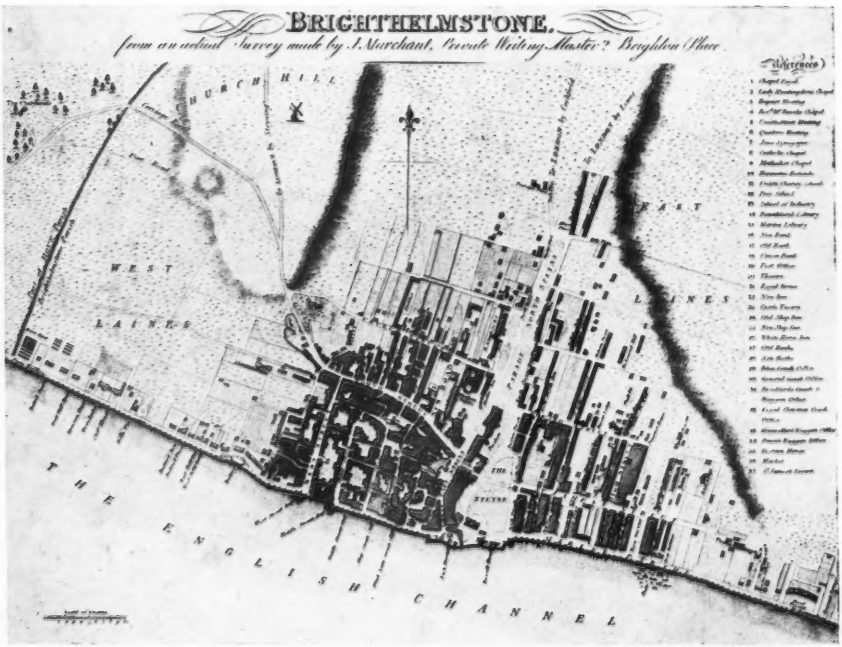
The expansion of the built-up area in this period is clearly seen by a comparison of Yeakell and Gardner's map of Brighton in 1779 (Plate 4) with those made by J. Marchant in 1808 (Plate 5) and by R. Sickelmore in 1824. Most of the development took place in two directions, northwards to Church Street and North Lane and eastwards from the Steine. In 1779 the only building east of the Steine was Thomas's Library (Plate 4), and Lambert's view of Brighton in 1765 (Plate 2) shows reapers and teams of oxen working on ground now occupied by the houses of St. James's Street and Edward Street. On Marchant's map both these streets are shown and houses extend in a continuous line on the Marine Parade as far east as Rock Buildings. Royal Crescent, which had just been completed in 1807, stands in isolation on the cliffs a short distance away from the main town (Plate 9). From Sickelmore's map it can be seen that much building had taken place between Edward Street and Carlton Hill, and that Carlton Hill and Sussex Street were creeping up the very steep slopes of the Downs which border the eastern side of the Steine. Expansion on the west side of Brighton had not been so rapid, but Marchant shows Russell Street (named after the great doctor) which had been begun as early as 1775. Beyond this street Sickelmore shows Cannon Place, Regency Square (built 1818–28), Preston Street and Bedford Square (completed 1818).

Between 1820 and 1830, the years of George IV's reign, there was a spate of building. The town's population increased from 24,429 (1821) to 40,634 (1831), while its houses increased from 3947 to 7700. That is to say, the number of Brighton's houses virtually doubled while George IV was king, and there is thus some justification for W. M. Thackeray's remark in 'The Newcombes' that myriads of Londoners ought to thank George IV "for inventing Brighton." Maps of Brighton in 1824–25 by J. Pigott Smith

[1] Sitwell and Barton, *op. cit.*, p. 232.
[2] Cobbett, *op. cit.*, vol. 2, pp. 690–91.
[3] Wright, *op. cit.*, p. 102.

*3. The earliest view of Brighthelmston, showing a French attack in 1514*
*British Museum*

*4. Brighton in 1779. From the map by Yeakell and Gardner*




*5. Brighton in 1808. Map by J. Marchant*

and in 1827 by J. Bruce (Plate 10) show the expansion of the town in this period. Two great estates were being developed and form splendid examples of the virtues of planning. The design and lay-out of both was the work of the two Wilds (Amon and Amon Henry) and C. A. Busby.[1] The Kemp Town estate on the east cliff was developed as a speculation by T. R. Kemp, M.P. The building of Sussex Square and Lewes Crescent was begun in 1823 and their façades were finished in 1828. Sussex Square is larger than Grosvenor Square in London and the span of Lewes Crescent is 840 feet, 200 feet wider than Royal Crescent, Bath. Bruce's map shows Kemp Town separated from Brighton by open country. Kemp's plan was never completed, as will be seen from a comparison of Plates 15 and 16.

On the west Brighton began to spill over its boundary into the manor of Wick, now part of Hove. The building of Brunswick Terrace and Brunswick Square (both outside Brighton proper) was begun in 1824, the whole estate being sometimes known as Brunswick Town. Beyond it the eastern side of Adelaide Crescent was started in 1830 but the whole crescent was not completed until 1860. Bruce's map marks St. Peter's Church, built in 1824–28 by Sir Charles Barry the architect of the Houses of Parliament, on a fine site at the northern end of the Steine with the open space known as the Level to the north of it. This church was constituted the Parish Church of Brighton in 1873, superseding the old church of St. Nicholas.[2] The siting of the new church is another example of wise planning at this period. The views of the town from the north in 1819 (Plate 12) and the tower of St. Peter's Church in 1837 (Plate 13) indicate the development which took place between those years. On Plate 12 agricultural activities can be seen in progress on land that is now covered with houses.

Lewis's map of Brighton in 1835 shows that the line of building on the front was then nearly continuous from the uncompleted Adelaide Crescent on the west to Kemp Town on the east, a distance of nearly 3 miles. The map also shows that Hove and Preston were then small villages quite distinct from Brighton and that Brighton Gas Works, erected at Black Rock in 1818–19, and the gasworks built by another company in 1835 on a site adjacent to Hove Church, were then in open country. The works at Black Rock were erected just outside the boundary of Brighton in order to escape the dues then charged on all coal brought into the town. Coal was landed on the shore and hauled to the top of the cliff or carted through a tunnel that led from the shore to the works.[3]

Two further events in the 'twenties helped to further Brighton's prosperity; one was the opening of the German Spa, the other the erection of the Chain Pier. The establishment of the German Spa in June 1825 by Dr. F. A. A. Struve of Dresden renewed Brighton's fame as a watering place for a cure. Artificial mineral waters, warm and cold, resembling those of Carlsbad, Kesselbrunnen on Ems, Marienbad and other continental spas, were

[1] See A. Dale, 'Fashionable Brighton 1820–1860,' 1947, for a detailed account of the architectural history of Brighton at this period and especially for the work of the Wilds and Busby.

[2] By 1842 there were 13 Anglican churches in Brighton; in 1948 there were 36.

[3] W. H. Attwick, 'Brighton since the grant of the charter 1854–1929,' p. 15, 1929.

manufactured at the German Spa which was built south of the park now called Queen's Park. In the words of the Prospectus, "the institution has for its object the perfect imitation of the principal Mineral Waters of Germany, so that no difference can be perceived between the natural and artificial productions either in regard to their sensible properties, or to their effects on the human frame." [1] The attractive buildings of the German Spa and the Pump Room with its colonnade supported on Ionic pillars still survive (Fig. 2). As the Spa enjoyed the patronage of royalty, it soon became known as the Royal German Spa; King William IV, the Duchess of Kent and other members of the Royal family were constant visitors. In the 'thirties hundreds of people attended at the Spa for four to five weeks, proceeding there every day between 8 a.m. and 10 a.m. to drink the waters, and paying the subscription of a guinea per week. Dr. W. King in 1826 expressed his belief that "Dr. Struve. has introduced among us one of the greatest blessings which this country has known "; [2] while Dr. A. B. Granville in 1841 regarded the existence of the German Spa as the only 'reason for sending real patients to Brighton.' [3] 'D. B. Friend's Brighton Almanack for 1886' (p. 191) says that "years ago, visitors of all ranks and grades amongst the Upper Ten drove in their carriages daily to the Royal German Spa, to partake of Dr. Struve's Mineral Waters; indeed the number of vehicles standing along one side the street, leading from the Spa in the direction of the sea, often ran largely into three figures. At the present such a sight is not to be witnessed; the once fashionable method of drinking waters by persons going in carriages to the Royal German Spa is a thing of the past never, probably to be revived." Although the German Spa was not fashionable for long, its existence had helped to increase Brighton's reputation as a health resort.

George III, that lover of Weymouth, did not care for Brighton whose chief characteristics were, he said, "treeless land, shadeless shore and shipless sea." The epithet "shipless" was undeserved, for before Newhaven was developed as a port for cross-channel traffic, Brighton itself was a point of departure for passengers bound for France. The Brighton–Dieppe route was not so important as the crossing by Dover–Calais, but during the summer it carried a large number of passengers who were embarked and landed at Brighton by small boats from the shore. The point of embarkation was between Ship Street and Middle Street. Transport to and from the shore in small boats could be very unpleasant if not hazardous in bad weather and the construction of the Brighton Chain Pier in 1823 was a great boon to passengers. By 1836 two steam packets were running twice a week from the pier to Dieppe in the summer months, and Brighton received "much benefit from visitors to France, who prefer the more short and pleasant route by Rouen to Paris, to that by Calais." [4] After the railway was built as far as Newhaven

[1] F. A. A. Struve, 'Prospectus of the newly established German Spa at Brighton,' 1825.

[2] W. King, 'Observations on the artificial mineral waters of Dr. Struve of Dresden, prepared at Brighton with cases' p. 27, 1826.

[3] *See* Granville, *op. cit.*, vol. 3, pp. 571–7, for an eulogistic account of Brighton's German Spa. Edwin Lee's 'Brighton and its sanative resources; comprising a special reference to the German Spa,' 1850, is also useful.

[4] Dugdale, *op. cit.*, p. 276.

in 1847, the Brighton–Dieppe route gave way to the Newhaven–Dieppe crossing. Brighton's days as a channel port were over. Brighton had never been a good port; in storms or when the wind came from the wrong quarter, vessels were bound to stand out to sea or to shelter in Shoreham harbour.

From its opening the Chain pier was popular as a place of fashionable resort. King William IV was particularly fond of pacing up and down its 350 yards and like the German Spa the pier became another place for the seekers after health. "Invalids and sick—young and old, are dragged to the furthest extremity of the chain pier, to inhale to the greatest advantage the invigorating sea breezes, and concentrated upon a single spot, they give a decided colour to the place, rendering it an open air hospital, and tempting one to impose upon the town the ancient Saxon designation of Bath—the sick man's city." [1] Dr. Wigan in his study of the three climates of Brighton, a regional sub-division of the town, remarked that the "delightful promenade the Chain Pier is so frequent a cause of indisposition in the early part of the year, that I have been accustomed to say that it ought to be maintained at the expense of the medical men of the town, from the practice it brings them." [2] A pier became an absolute necessity for every important seaside resort and Brighton, like Margate, eventually possessed two piers; Blackpool has three. After being closed as unsafe, the Brighton Chain pier was destroyed in a great storm in December 1896.[3] The Palace pier replaced the Chain pier in 1901 and was built some distance west of its predecessor. Meanwhile the West pier, due south of Regency Square, had been opened in 1866 and was enlarged in 1893.

On the death of George IV in 1830, royal favour to Brighton was continued by William IV who paid regular visits to the Pavilion. Queen Victoria visited the Pavilion in 1837, the year of her accession, again in 1838, 1842, 1843 and for the last time in 1845. The Queen and Prince Albert were very annoyed by the lack of privacy and by the pressing crowd of sightseers at Brighton. *Punch* early in 1845 spoke of the "pack of ill-bred dogs," which hunted the royal couple "to the very gates of the Pavilion." [4] It was decided to give up the Pavilion as a royal palace and Osborne House, Isle of Wight, was chosen as the new royal seaside residence. In 1841 Dr. Granville had said that the Pavilion was on the wrong site and ought to have been built in Kemp Town. "The Pavilion," he writes, "would then have formed a marine palace fit for an English sovereign; whereas now, though head of the first maritime nation in the world, that sovereign cannot boast of a royal residence from whence she may contemplate the field of her country's glories."[5] Dr. Wigan also said that for climatic reasons the Pavilion was in "perhaps the very worst spot which could be selected for her Majesty's residence." He argued that a Marine Palace should be built elsewhere in another part of the

[1] *New Monthly Mag.*, 61 (1841), p. 168.

[2] A. L. Wigan, 'Brighton and its three climates; with remarks on its medical topography, and advice and warnings to invalids and visitors,' p. 45, 1845. This book is an interesting forerunner of what is now called local climatology.

[3] J. G. Bishop, 'The Brighton chain pier: in memoriam. Its history from 1823 to 1896,' 1896.

[4] *Punch*, 8 (1845), 108.

[5] Granville, *op. cit.*, vol. 3, p. 582.

country and rightly believed that this "would ultimately be no disadvantage to the town of Brighton, which has long outgrown its dependence on royal patronage." [1] In 1850 the town of Brighton bought the Pavilion estate for £50,000. The town got a good bargain as the land and buildings alone had cost George IV over £356,000. It was also a great benefit to the planning of the town that it should have acquired this fine site and that the land was not given over to the speculative builder; the firm of Cubitt is said to have offered £100,000 for the property.

The decade 1831–41 had been a trying one for Brighton. The town's population only increased by 6000 persons to a total of over 46,000, and the number of its houses increased by only 437 to a total of 8137. Even this apparent increase of 6000 is illusory. The census of 1831 was taken in May, while that of 1841 was made in June when there would probably be more visitors. The figure for 1841 also included a large number of labourers then building the railway in Brighton. Royal patronage was not so valuable as it had been in George IV's time and Brighton had become as large and as prosperous as the coaching system of travel could allow. If anything, over-building had taken place. Many houses in Kemp Town were untenanted and there were numerous unfinished houses in the west of Brighton. But a new era of growth was about to begin, due to the coming of the railway. Expansion was to be greater and more rapid than that already brought about by the activities of either the medical profession or of royalty.

*The coming of the railway*

The idea of building a railway from London to Brighton was first discussed in 1825. Ten years later no less than six rival lines had been projected. The chief problem was whether the "natural" route, running west of the Forest Ridges through Horsham and down the valley of the Adur to Shoreham and along the coast to Brighton, should be used, or the shorter "direct" route with several tunnels. Of the six schemes, Sir John Rennie's was the shortest and, as originally projected, covered a distance of 47½ miles. But the route by way of Croydon, Merstham, Balcombe, Haywards Heath and Clayton involved 5 miles of tunnels. The line surveyed by Robert Stephenson took a more westerly course by way of Leatherhead, Dorking, Horsham and Shoreham and made use of the valleys of the Mole and the Adur; its length was over 55 miles but it required only 1 mile of tunnelling. Of the other four schemes only one, Palmer's, took a course to the east of Rennie's "direct" route.[2] Eventually, in 1837, after a long struggle Parliament accepted the verdict of Captain Robert Alderson, a government engineer, in favour of Rennie's line. Alderson's report includes these words: "In comparing these objections [those of physical geography], in an engineering point of view, with the advantage the 'direct' line possesses, I am of opinion the latter are not too dearly purchased and that it is the best line between London

[1] Wigan, *op. cit.*, pp. 67–71.

[2] For accounts of the six routes, *see* M. F. Long, "The genesis of the L.B. and S.C. railway," *Railway Mag.*, 24 (1909), 392–9, 479–486; A. Dale, "The construction of the London to Brighton railway," *Sussex County Mag.*, 8 (1944) 89–94; C. F. Dendy Marshall, 'A history of the Southern Railway,' pp. 255–77, 1936.

Phot. Aerofilms, Ltd.

*6. The old town of Brighton*

Phot. Aerofilms, Ltd.

*7. The Steine and central Brighton*

Phot. Brighton Herald, Ltd.

*8. Brighton Pavilion, west front*

Phot. Country Life

*9. Royal Crescent, Brighton*

and Brighton." [1] Alderson was forced to admit that Stephenson's scheme was preferable from an engineering point of view, but he held the opinion that Rennie's termini in Brighton and London were more conveniently placed and that branch lines could be more easily constructed from the "direct" line. The Brighton terminus of Stephenson's line had been planned for a site north of Western Road, opposite Waterloo Street. This line was violently opposed by the residents of Brunswick Town because both line and station were so near their first-class estate. Rennie's Brighton terminus was first designed to be built north of the Level in the Lewes road but its position was later altered to the present remarkable site. The steep eastern slopes of the Dyke Road ridge had to be levelled before the station could be built and 3500 men and 570 horses were engaged in its construction. An early Guide remarks that "the station-house, which cost £12,000 resembles the palace of a prince; whilst it vies in size and beauty with the town hall." [2] The position of the terminus did not please contemporaries, who described it as being "quite in the northern suburb of the town, involving for pedestrians a long and not very agreeable walk." [3]

Construction of the line began in 1838. Advocates of the Brighton "direct" route, afraid of losing the support of Shoreham, had agreed to build a westward branch to that still important harbour, and this line was opened in May 1840. The main line from London was opened to Haywards Heath in July 1841, and to Brighton in September of the same year (Fig. 3). The line from Brighton to Lewes was opened in June 1846. Owing to the position of the Brighton terminus it was necessary for the Lewes line to cross the London road combe by a viaduct and "this elegant specimen of railway engineering," [4] which required ten million bricks for its construction, was much admired by visitors to Brighton. The viaduct took ten months to build. During the last war two arches and a pier were damaged by enemy action and temporary repairs took five weeks. When the Kemp Town branch was built in 1869 this short line, under 2 miles in length, required a viaduct across the Lewes road as well as a long tunnel. It was closed to passengers in 1933 but is still used for goods traffic. The fourth line built at Brighton was the Cliftonville Spur, completed in 1879, a loop line which follows a tunnel under the Dyke Road ridge and enables trains from London bound for Hove and Shoreham to avoid Brighton terminus (Fig. 3). Plate 14, a view of Brighton made from a French balloon in August 1846, only two months after the Preston viaduct had been opened, shows that the station was built, like the London termini, on the very edge of the built-up area as it then was. It can also be seen that the viaduct was built in open country some distance north of the main area of Brighton's buildings.

The immediate result of the construction of the railway to Brighton was to increase the rush to the coast (Plate 19). The London proletariat was now able to escape to the sea for at least one day and more people were needed to cater

[1] Dendy Marshall, *op. cit.*, p. 263.

[2] 'London and Brighton railroad, with a Brighton guide,' p. 18, 1840.

[3] G. Measom, 'The official illustrated guide to the L.B. and S.C. Railways,' pp. 47–8. 1853.

[4] *Illustrated London News*, 13 June 1846.

for their amusement. Brighton's population leaped from 46,000 in 1841 to 65,000 in 1851, to 77,000 in 1861 and to over 90,000 in 1871. In 1854 Brighton's petition to Parliament for incorporation as a Borough was successful. In the first thirty years of railway communications Brighton's population had virtually doubled, and in the same period its houses increased by about the same proportion from 8137 to 15,376. Between 1831 and 1841 only 437 houses had been built, but in the ten years after the coming of the railway 2806 houses sprang up. Between 1851 and 1861 a further 2396 were built and another

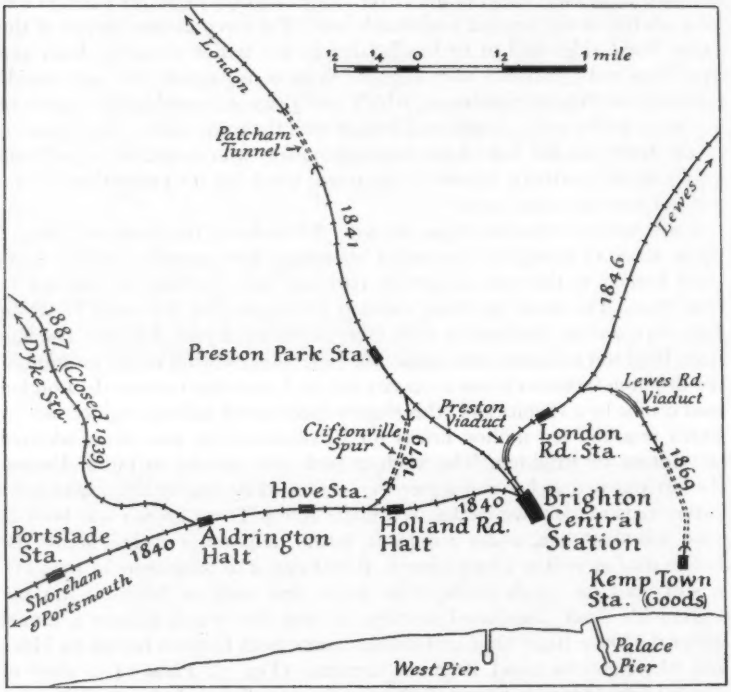



*Fig. 3. Railways. Dates of opening of each section of line*

2037 in the next decade. It was only after 1841 and the arrival of the railway that Brighton became "the lungs of the great capital." [1] Knight's 'Excursion companion' of 1851 (p. 6) commented on this development as follows: "Towards this increase the railway has contributed, and is contributing, an ample share. The number of passengers brought into the town daily by the railway is astonishing. On holiday occasions, in fine weather, there seldom arrive fewer than 5000 visitors in the London trains. The number of passengers in one week in May 1850 was upwards of 73,000.[2] This large influx of

[1] *New Monthly Mag.*, 61 (1841), p. 171.

[2] In 1938 the average number of passengers arriving daily at Brighton (including season ticket holders) was 8,500. In the three days of the August Bank Holiday of that

strangers to the town has fully reconciled the inhabitants to the changes which were effected by the introduction of the railway system, respecting which, at first, many of the tradespeople and other inhabitants felt much apprehension. Previous to the opening of the railway there were thirty-two coaches passing daily in each direction, between London and Brighton. There is now not one. The greatly increased facility of access afforded by the railway between Brighton and the metropolis, has caused a considerable demand for house accommodation, to meet which, building is going on extensively." W. Saunders' map of Brighton in 1852 (Plate 11) shows the extent of building in the first decade after the opening of the railway. Houses had been erected rapidly north of Trafalgar Street between the London road and the railway and they were springing up fast to the west and south-west of the station. The handsome quarter of large imposing houses now known as the Seven Dials was also coming into existence.

Mr. Antony Dale in his recent book on Brighton expresses the opinion that the years between 1830 to 1860, "in many ways far more than the Regency, represented the height of Brighton's fashion, with its zenith at the season of 1848–49, when so many of the royal and political exiles who had sought shelter in England from the disturbances of their own country came with the flood of English society to pass some or all of the winter on the south coast." And he considers that "it was at this period that Brighton really succeeded Bath as the centre of fashion and the provincial capital of social life." [1]

Another result of the coming of the railways was to increase the number of boarding schools on the south coast. Brighton with its great reputation for a healthy climate became a favourite place for the establishment of boarding schools and was actually known as School Town.[2] Charles Dickens, himself a frequent visitor to Brighton, in his 'Dombey and son' (1846–48) makes little Paul Dombey go to Dr. Blimber's establishment for young gentlemen, "a mighty fine house, fronting the sea" at Brighton. In 1857 Mrs. Merrifield remarked that "few towns in England possess a greater number of educational establishments. Not to mention the charity and public schools, Brighton contains no less than 132 schools for ladies, and 120 for gentlemen, of which many are preparatory." [3] Perhaps these figures were exaggerated as J. G. Bishop stated that schools in Brighton during the period 1850–70 "increased in a much greater ratio than the population" [4] and calculated by a comparison of directories that there were 165 boarding schools in 1870, an increase of 64 over those of 1850. Friend's 'Almanack' for 1886 gives a list of 49 schools for Gentlemen and 77 schools for Ladies. The census of 1871 records that there were 1607 persons in boarding schools at Brighton. One of the familiar Sunday sights of Brighton in the prosperous 'sixties and 'seventies is described by Cuthbert Bede. "A large proportion of the one hundred boys' schools were also promenaded along the King's Road, carrying their prayer-books in

year 156,300 passengers arrived by train. The normal daily service of trains between London and Brighton was then 99 in each direction. In recent years about 1¼ million persons have come by train to Brighton during the months of June to August inclusive.

[1] Dale, *op. cit.*, p. 17.

[2] 'D. B. Friend's Brighton Almanack for 1886,' p. 97.

[3] Mary P. Merrifield, 'Brighton past and present,' pp. 37–8, 1857.

[4] J. G. Bishop, 'Brighton in the olden time,' p. 375, 1892.

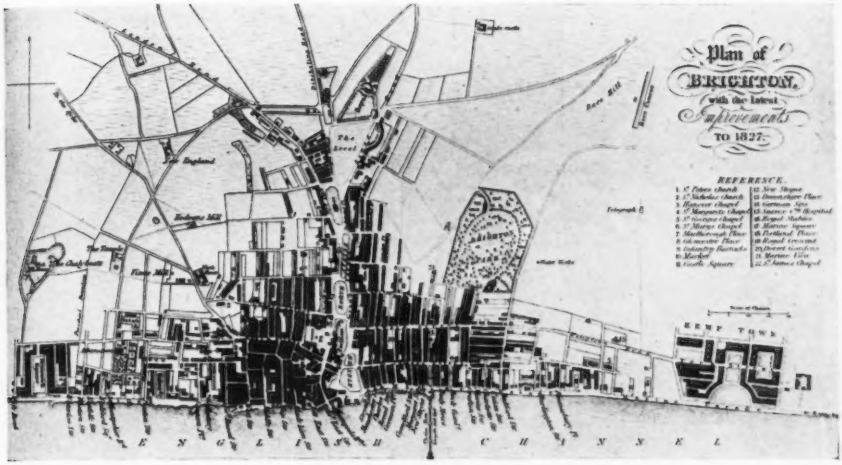
their hands, to show that they were on their way to or from church. As they were all in their Sunday best, and were marched in orderly fashion along the pavement on the town side of the road, it was a good opportunity for the various Dr. Blimbers of the place to advertise their respective establishments and the number of young friends who had been confided to their tutorial care; and to do these Dr. Blimbers justice, they usually found that the shortest way from their school to the church lay along the King's Road or Marine Parade, where their pupils could breathe the sea air and recruit their health." [1] Roedean School started in one house in Lewes Crescent in Kemp Town in 1885 and did not move to its present site until 1899.

Brighton was particularly prosperous in the 'seventies. The first edition of the 6-inch Ordnance Survey map of the town as surveyed in 1873–75 (Plates 17 and 18) gives a good picture of the rapid extension of the built-up area in all directions from the railway station and along the Lewes road that had taken place since 1841. On the front also, Adelaide Crescent, begun in 1830, had been completed by 1860 while Palmeira Square had been built between 1855 and 1870. That "cyclopean pile," the Grand Hotel, "with its nine tiers of rooms, with their elaborate ornamentations and bronzed and gilded balconies, from which the visitors could luxuriate in the lively panorama of sea and land that was spread to their view," [2] was opened in 1864. This hotel was to receive in 1890 a neighbour even larger than itself, the Metropole Hotel whose aggressive colour breaks the prevailing whiteness of Brighton front. In this mid-Victorian era the most fashionable season was from the beginning of October until after Christmas; the summer months were abandoned to the plebeian multitudes. The "Regency reputation for rakishness" continued right through the Victorian era; in 1841 it had been said that "Brighton is the most convenient spot to all the south-eastern part of the Kingdom, when in search of 'a lark,' and a great recommendation that is." [3] Hove, on the other hand, was not created until the second half of the nineteenth century and has always maintained an air of Victorian respectability.

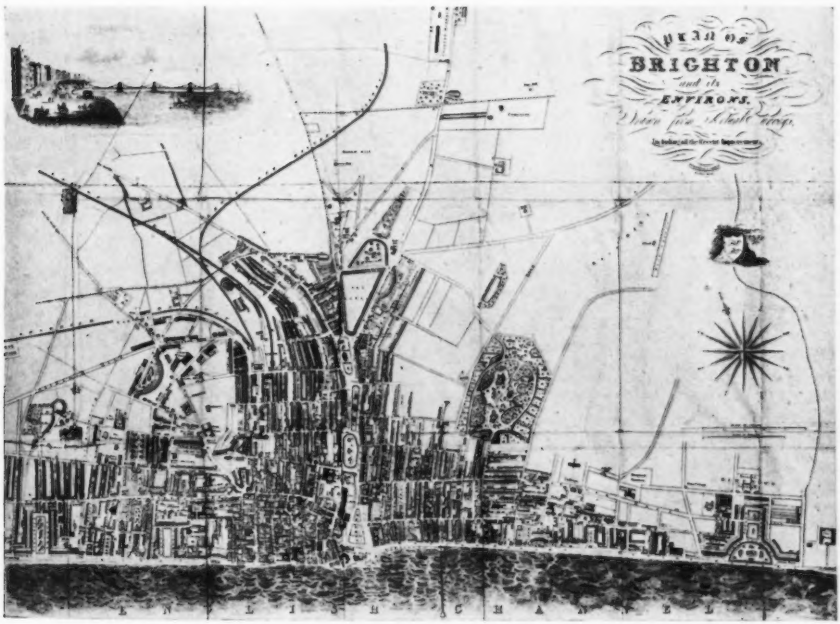
Brighton's population grew from 90,000 in 1871 to 107,000 in 1881 but this increase is partly accounted for by an extension of boundaries. Since 1881 and especially since 1901 the rate of increase has slowed down. The population only expanded from 123,000 in 1901 to 147,000 in 1931 at the last census, and that in spite of a considerable extension of boundaries in 1928. There is no doubt that from about 1900 Brighton has felt the competition of other, more modern resorts. Moreover, the increase of resident population in the Brighton district has taken place in other parts of the conurbation, especially in Hove. Brighton has become less and less fashionable with the upper classes during the course of the present century, though it had a temporary revival during the reign of Edward VII whose visits renewed the old royal connection with the town.

The map of Brighton in 1875 (Plate 18) shows that the built-up area of the town was not so markedly different from that of 1920 as might have been expected. Nevertheless, much building took place between 1875 and 1920

[1] Bede, *op. cit.*, vol. 2, p. 169.
[2] *Ibid.*, vol. 1, p. 192.
[3] *New Monthly Mag.*, 61 (1841), 169.




*10. Brighton in 1827. Map by John Bruce*




*11. Brighton in 1852. Map by W. Saunders*

*Courtesy Brighton Art Gallery and Museum*

*12. Brighton from the north in 1819*

*Courtesy Brighton Art Gallery and Museum*

*13. The same scene in 1837*

especially in the Preston and Hollingbury districts. The large block of streets that extends northwards from Ditchling Rise to Loder Road and Balfour Road and lies east of Preston Park, and many of the houses between the main railway line to London and the Dyke Road, were built at that time. Large housing estates were erected in the period between the two wars, and especially after 1931 there was much building in the Patcham, Falmer, Whitehawk and Ovingdean valleys. But the purpose of these estates was mainly to rehouse

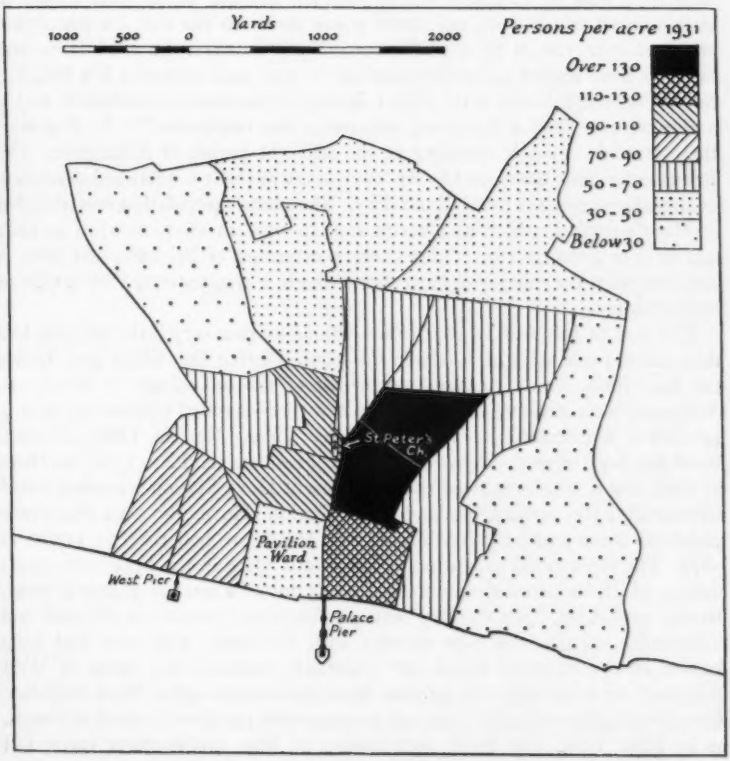



*Fig. 4. Density of population. Wards of central Brighton.*

the population affected by slum clearance in central Brighton rather than to receive new residents from elsewhere. In 1921, before the extension of its boundaries in 1928, Brighton was the second most densely peopled county borough in England and Wales with an average density of over 55 persons to the acre.[1] In 1931, two of the wards on the east of the Steine had over 130 persons per acre (Fig. 4). Since that date a considerable outflow has taken place from the centre to the new suburbs. The old nucleus of Brighton

[1] West Ham with 64 persons per acre was the first.

(Pavilion ward) is a "city" with an appreciably lower density of night-time population (Fig. 4) than the surrounding wards since so much of its area is occupied by offices and shops.

### HOVE

During the last seventy-five years a relatively far greater expansion of resident population and of built-up area has taken place at Hove than at Brighton. This development will be briefly described. Before 1830 Hove was only a small village with one street going down to the sea. Its population was just over 100 in 1801 and exceeded 300 in 1821. In 1806 Hove was said "to have started a bathing machine or two, and opened a few lodging-houses, where, if health is the object, it may be purchased as certainly, and at a cheaper rate than at its proud and overgrown neighbour." [1] At that time there was not a single dwelling in the adjacent parish of Aldrington. The Brunswick estate, developed in the 'twenties, was really a westward expansion of Brighton across the town's boundary. The estate's population was included in Hove's figures, which as a result rose to 1300 in 1831, to 2500 in 1841 and to over 4000 by 1851. This western extension of Brighton had little in common with the village of Hove from which it was separated by a mile of open country.

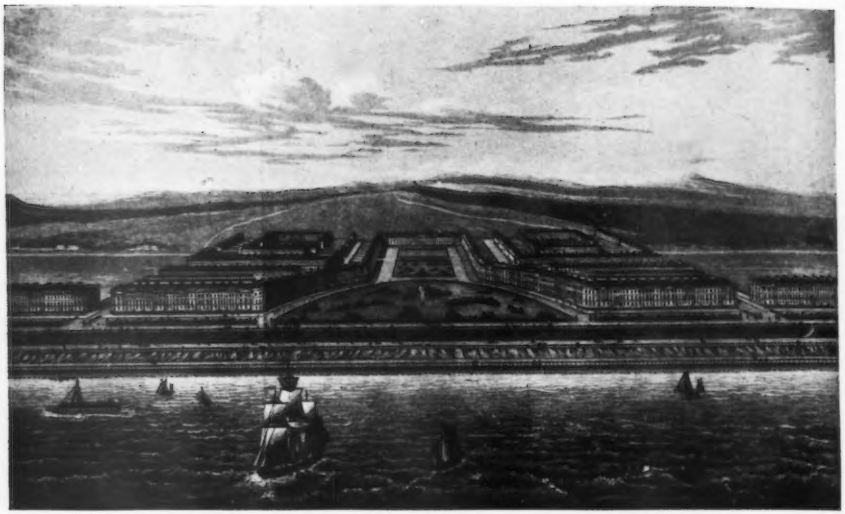
The map of Brighton in 1875 (Plate 18) shows that very little building had then taken place west of Adelaide Crescent. During the 'fifties and 'sixties the land immediately east and north-east of the old village of Hove was developed with amazing rapidity and a new district called Cliftonville sprang up like a mushroom. Its streets—Albany Villas, Medina Villas, Seafield Road and St. Aubyn's—are made up of large residences. Plate 17 shows Hove in 1873 and it will be noticed that the present Hove Station was then called Cliftonville; the present Holland Road Station, Hove. By 1861 the whole parish of Hove had 9000 inhabitants, and the figure had risen to 11,000 in 1871. The most rapid expansion of Hove took place in the next thirty years during which its population increased by 25,000 to a total of 36,000 in 1901. In this period the open country between Adelaide Crescent on the east and Cliftonville on the west was covered with buildings. This area had been known as the Stanford estate and eventually received the name of West Brighton; on some maps the present Hove station was called West Brighton. Broad, well-planned, ugly Victorian avenues with numbers instead of names, as in New York, and lined with houses of little architectural merit but redolent of suburban respectability, were built on the Stanford estate. The prosperous avenues of West Brighton were aptly described as "Belgravia-sur-Mer." [2] The numbered avenues as planned are marked in outline on the map of 1873 (Plate 17): the houses had not then been built.

Owing to its steady increase in size Hove was incorporated as a Borough in 1898. Five years earlier it had absorbed the parish of Aldrington which lay beyond its western boundary. Hove has a very different character from that of Brighton, and this probably explains why it has most vigorously opposed all proposals for combination with Brighton under one administration.

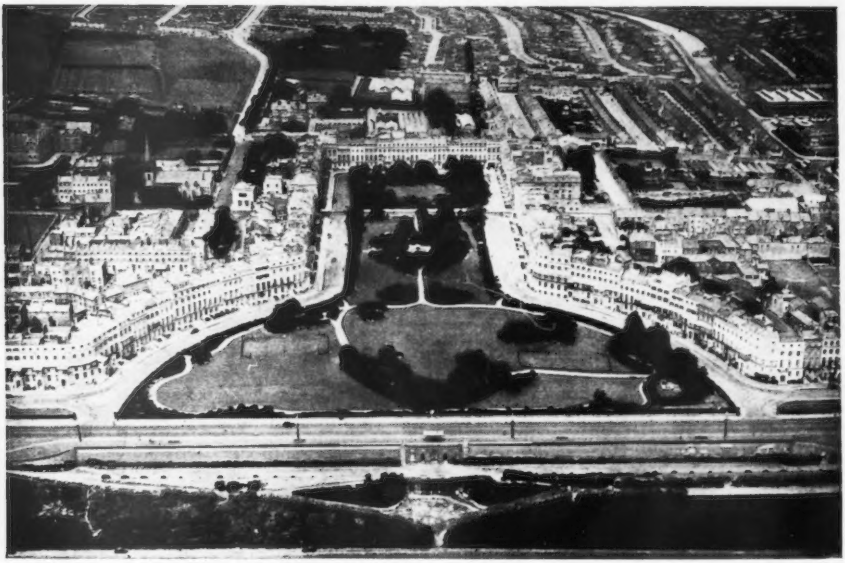
[1] 'A guide to all the watering and sea-bathing places,' p. 95, 1806.
[2] John Sawyer, 'The Brighton handy-book and guide to the town,' p. 45, 1890.

*14. The first aerial view of Brighton, 184*

*Courtesy Brighton Art Gallery and Museu*



*15. Kemp Town as originally planned, 1825*



*Phot. Daily Mail*

*16. Kemp Town in 1930*

The growth of Hove in the present century has been substantial. It has expanded from 36,000 in 1901 to 46,000 in 1921 and to 65,000 in 1946, and is now therefore nearly half the size of Brighton. In 1947 Hove had 23,441 separately rated properties including 927 shops. The fact that it contained only a quarter as many shops as Brighton emphasizes the difference in character between the two towns. Between the wars Hove was spreading northwards to the Downs, and the parish of Hangleton, which in 1931 held only 109 people, is now filled with streets. At the same time Hove was extending westward so that its built-up area joined that of its neighbour, the Urban District of Portslade-by-Sea. A feature of Hove's development in the 'thirties was the erection of flats; between 1932 and 1938 no less than seventeen blocks of flats were built in the town.

## BRIGHTON'S PRESENT FUNCTIONS

Brighton has four main functions; as a residential town and pleasure resort, as an industrial town, as a dormitory for London, and as a regional centre for south-east England. The increased use of these functions accounts for Brighton's growth from about 100,000 inhabitants in 1881 to about 150,000 in 1948.

Not only do temporary visitors pour into Brighton for health and pleasure, but persons retired from active work come to Brighton and Hove to find homes in their old age.[1] It is difficult to disentangle residential development and holiday traffic. In 1947 there were 40,856 separately rated houses and flats in Brighton which is evidence of the number of its homes. The extent to which Brighton is a pleasure resort can be measured by the fact that there were before the war no less than 2100 recognized lodging and apartment houses and 205 hotels in the built-up area alone; and there were 110 public houses within half a mile of the Palace Pier. The town has seven theatres and twelve cinemas.[2] It has been estimated that Brighton and Hove together can accommodate about 200,000 visitors at any one time and that the annual number of visitors staying for one night or more in Brighton and Hove is between four and five millions. Plate 20 provides evidence of the size of the crowds of visitors on Brighton beach on a bank holiday.

The possession of the Pavilion in its very heart, and of so many hotels, makes Brighton a particularly suitable place for conferences; in 1947 there were thirty-one conferences attended by a total of 18,000 delegates who brought an estimated revenue of half a million pounds into the town.

In 1862 the author of a book on Brighton said that "manufacturing towns are described in the school geographies as 'seats of commerce,' " but that he would "describe Brighton as a 'seat of pleasure,' " as he "could never discover that anything whatever is manufactured at Brighton"; and he asserted that "the town imports both its goods and its customers."[3] At the present time

[1] For a comparative account of some features of the social structure of English seaside towns, including Brighton, *see* E. W. Gilbert, "The growth of inland and seaside health resorts in England," *Scott. Geogr. Mag.*, 55 (1939) 16–35.

[2] Elizabeth Brunner, 'Holiday making and the holiday trades,' p. 51, 1945. The Brighton cinemas have a seating capacity of over 22,500, and the theatres of over 5,200.

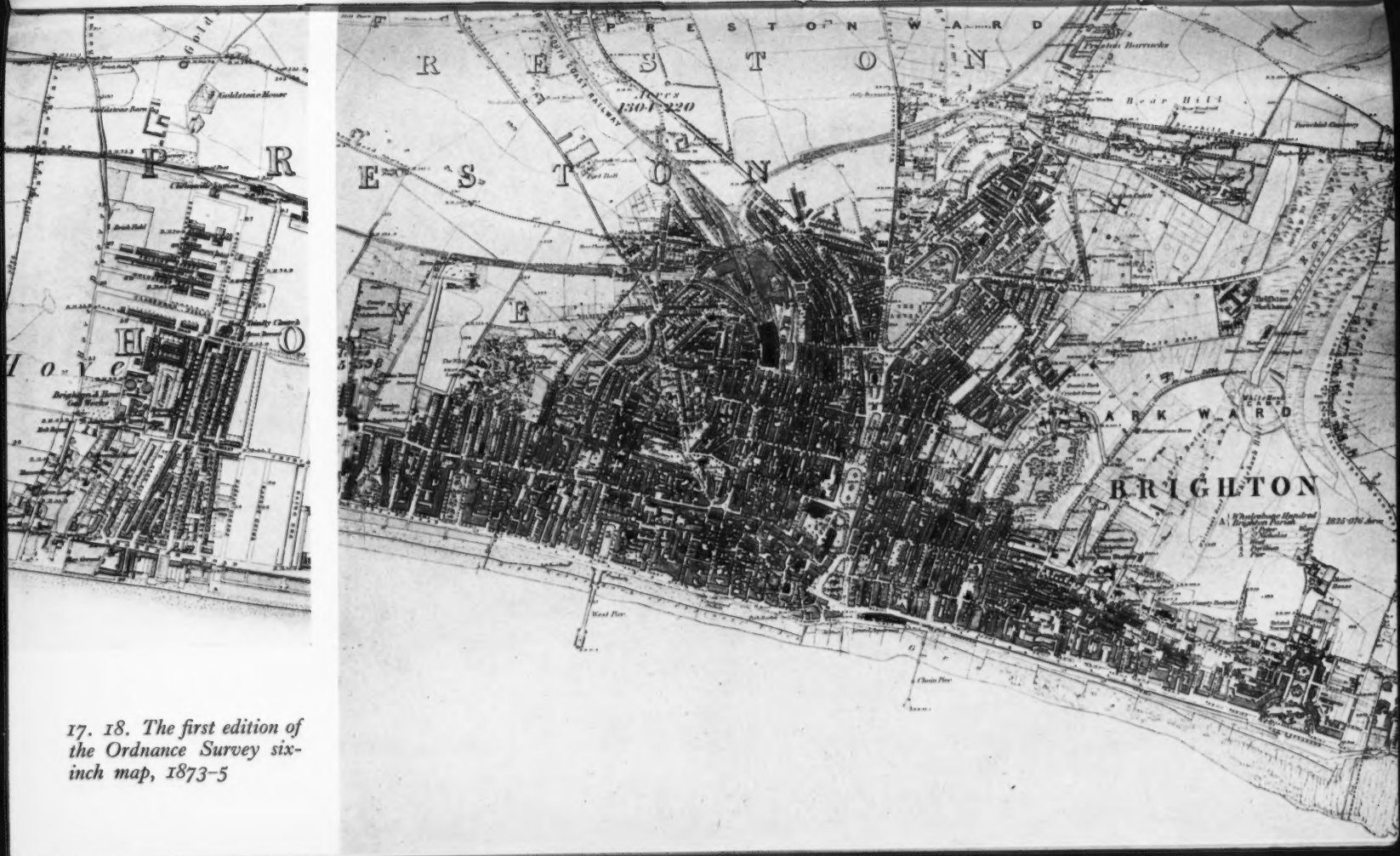
[3] 'Brighton: the road, the place, the people,' pp. 120–3, 1862.

it is certainly true that the hotel and catering industries give considerable employment, to some extent seasonal; there were over four hundred unemployed in these industries in December 1948. But these are not the town's only industries. In 1947 about 9 per cent. of the workers employed within the area covered by the Brighton Employment Exchange were engaged in general or electrical engineering, as compared with 8 per cent. in the hotel and catering industry. The railway works of the old L.B. and S.C. Railway, adjoining the Central station, cover an area of twelve acres and employed 850 workers in 1947. Between Shoreham and Brighton a number of factories, including the Ronuk polish factory and Dubarry's Perfumery are placed along the Brighton–Shoreham railway. The main works of C. A. Vandervelt, now known as C.V.A., are in Hove. In Brighton itself a quasi-industrial area of six acres fronts the Lewes road; here are the Corporation Transport Depot, electrical engineering works, a mineral water factory and other works together employing rather more than 1500 persons. In 1939 the Corporation conveyed nineteen acres at Moulsecoomb, adjoining the Brighton–Lewes railway, to an electrical firm which now employs 1480 persons on the site; the factory lies conveniently between two corporation housing estates. With a view to improving the balance of employment and of reducing excessive journeys to work the Brighton Council has set aside for light industry an area of eighteen acres near Hollingbury adjoining new housing estates. It is hoped to absorb about 2000 workers on the sites now being leased in the area. There is in Brighton a large number of small concerns providing a wide variety of light industry. Heavier industrial works, including the power station, are situated in the neighbourhood of Shoreham harbour. In this area are the Lancing railway engineering works to which 650 workers travel daily from the Brighton district by special train.

There has always been a certain amount of opposition by residents to the introduction of industry into seaside resorts. In 1895 G. A. Sala said that "Brighton is quite thriving enough as it is, and to convert it into a manufacturing town would be entirely and definitely to spoil it as a pleasure resort. Imagine grim brick factories eight stories high, and colossal shafts emitting volumes of grimy smoke in the Downs! No! No! Brighton must preserve its ancestral character as a place whither people of every degree repair to get well and to be amused." [1] At Brighton the policy of creating "a city beautiful" is still sometimes regarded as incompatible with the establishment of light industries, although it is realized that the latter might absorb some of the off-season surplus of labour. There is no doubt that the steady increase in the number of small light industries in the Brighton conurbation has been a primary cause of its growth during the last twenty-five years.

Brighton's present function as a dormitory for London is no new development. As early as 1823 Cobbett described the journey to work from Brighton to the capital as follows: "The town of Brighton, in Sussex, 50 miles from the Wen, is on the sea-side, and is thought by the stock-jobbers, to offer *a salubrious air*. It is so situated that a coach which leaves it *not very early* in the morning, reaches London by noon; and, starting to go back in two hours and a half afterwards, reaches Brighton *not very late at night*. Great

[1] G. A. Sala, 'Brighton as I have known it,' pp. 78–9, 1895.




*17. 18. The first edition of the Ordnance Survey six-inch map, 1873–5*

*The Illustrated London News*

*19. Brighton beach in 1859*

*Phot. Brighton Herald, Ltd.*

*20. Bank Holiday crowd near Palace Pier, 1935*

parcels of stock-jobbers stay at Brighton with their women and children. They skip backward and forward on the coaches and actually *carry on stock-jobbing*, in 'Change Alley, though they reside in Brighton." [1] In 1829 an editor of Dr. Relhan's work on Brighton could describe the town as "almost a suburb of the great city," [2] while in 1841 Dr. Granville said it was "a portion of the 'west end' of London *maritimized*." [3] In 1841 Dr. Wigan acclaimed Brighton as "the great Sanitarium of the largest and wealthiest city in the world." [4] And in 1851, in Knight's 'Excursion companion' (p. 5) it was said that "we might, indeed, almost class Brighton as a suburb of the metropolis, for the London merchant now goes backwards and forwards to his marine villa, as regularly, with more ease, and in as little time as he formerly occupied in driving to Hampstead or Norwood."

At the present time, many whose daily work is in London have their homes in Brighton. In 1938 the approximate number of season tickets valid for daily use to London from Brighton and Hove stations was 2436; by 1948 the figure had risen to 2754.[5] This development had been accelerated by the electrification of the London–Brighton railway in January 1933. Fast trains cover the distance from Brighton to Victoria in only sixty minutes, which makes the seaside town more accessible than some of London's adjacent suburbs. Indeed, as Professor A. Demangeon has said in his illuminating account of the seaside resorts of the south coast of England, "cette génération rapide de villes littorales n'est qu'un épisode nouveau dans l'évolution de la grande agglomeration de Londres." [6]

Brighton is the regional capital of south-east England and of Sussex in particular. It is true that Chichester and Lewes are the two county capitals of Sussex and that Tunbridge Wells was chosen as the administrative capital of the South Eastern Region in the wartime Civil Defence system. But Brighton has far greater claims to be regarded as the regional capital than any of these three towns, all of them small by comparison. Brighton, for one thing, is the shopping centre for a wide area. In 1937 there were 2946 shops in the central built-up area alone; that is, one shop for every 47 inhabitants. In 1946 the whole town had over 3500 shops with a total frontage of 11·1 miles, and nearly one-fifth of the workers employed in the Brighton Employment Exchange area are engaged in distribution. The Southdown Motor Bus Company have concentrated on Brighton and made it "town" for a wide area. No less than 10 per cent. of Brighton's workers are engaged in railway services or road transport—double the national percentage.

This is an age in which New Towns are being planned. It is even rumoured that the planning of a new seaside town is contemplated. If the planners build another Brighton they will not go far wrong. Brighton is a national asset, not only because it gives health to so many of the people of this country

[1] Cobbett, *op. cit.*, vol. 1, p. 149.
[2] A. Relhan, 'A short history of Brighthelmston' (ed. J. C. Michell, 1829), p. xiii.
[3] Granville, *op. cit.*, vol. 3, p. 565.
[4] Wigan, *op. cit.*, p. 9.
[5] In the same period the figure for Worthing rose from 497 to 617 and that of Eastbourne from 219 to 280.
[6] A. Demangeon, 'Les Iles Britanniques,' p. 239, 1927.

but also because it attracts foreign visitors. Thomas Dugdale said of Brighton in 1843 that "nothing that can assist the convalescence of the invalid, conduce to the comfort of the fastidious, or flatter the luxury of the dissipated is wanting at this place," [1] and his words are true to this day. Nevertheless, if Brighton is to continue to draw the tourist from abroad it must retain its character as a Regency town. The Pavilion, the classical squares, the terraces and crescents as well as the smaller Regency houses *together* give Brighton its peculiarly elegant charm. Yet this small type of house,

> With a staring bow window to let him explore
> What was passing in either bow window next door,[2]

is in especial danger of demolition. Many have been ruthlessly destroyed. After surviving the dangers of war, it seemed in 1945 that even Brunswick Square and Terrace and Adelaide Crescent, the only distinguished parts of Hove, might be deliberately torn down to make way for blocks of flats. Fortunately this monstrous proposal was universally condemned. But it has become necessary to protect the beauty of Brighton and Hove and their magnificent squares and terraces as well as their smaller individual buildings by means of a civic society, just as it has been essential to protect the amenities of Oxford, Cambridge, York and other town by similar civic societies or trusts. So, in December 1945, the Regency Society of Brighton and Hove was formed, one of its objects being "to save from destruction and disfigurement the squares, crescents, terraces, streets and individual buildings [built before the mid-Victorian period] which are of real architectural merit." Those who believe that the distinctive urban personality of such dignified towns as Bath, Cheltenham and Leamington should be maintained, will sympathize with the object of keeping unimpaired the equally distinguished individuality of Brighton. Quite apart from the question of aesthetics, it would be bad business to deprive Brighton of its historic character which makes her the most attractive seaside resort in the country if not in the world.

> Long shalt thou laugh thine enemies to scorn,
> Proud as Phoenicia, Queen of Watering places!
> Boys yet unbreech'd, and virgins yet unborn,
> On thy bleak downs shall tan their blooming faces![3]

This article is based on a paper read to Section E (Geography) at the Brighton meeting of the British Association for the Advancement of Science on 9 September 1948. The writer is especially indebted to Mr. W. H. Parker for much help in its preparation.

[1] Dugdale, *op. cit.*, vol. 1, p. 275.
[2] Horace Smith in 1830.
[3] James and Horace Smith, 'Horace in London,' 1828.

# ARNHEM LAND: EXPLORATIONS AMONG AN UNKNOWN PEOPLE

DONALD F. THOMSON

## PART III. ON FOOT ACROSS ARNHEM LAND

AT THE BEGINNING of October 1935 I made the longest and most important patrol that I was able to accomplish in the course of this expedition[1]; the crossing of Eastern Arnhem Land on foot from the Crocodile Islands to Blue Mud Bay and thence to the hills of the Walker river. The objective of this patrol was to demonstrate to the Government that, despite official forebodings, I had been able to establish myself with the nomads and that the area was really under control and safe for a white man who understood the natives and who approached them as fellow human beings.

Leaving the boat in Castlereagh Bay to the west of the mouth of the Glyde[2] river, I followed the valley of this stream south through the low-lying country of the Arafura swamps. The chief difficulty was in securing sufficient carriers to take the loads. For the first two or three days I was accompanied by about thirty-five natives, but the number dwindled as soon as they got out of the territory that was familiar to them and only five finally reached Mätarauwaitj on Blue Mud Bay. Many remembered feuds of long standing, for blood feuds among these people are carried on for many generations and the "pay back," as they call it, may be delayed for years in order to catch a man or a group off guard. When the natives deserted they generally disappeared without warning during the night.

Some distance inland we reached the Glyde river and followed the stream for some days to establish its identity and trace its source. In its lower reaches the Glyde follows a tortuous course, winding through a wide flood plain. It is strongly tidal for many miles and flows between high muddy banks fringed with mangroves. Emerging from the hills which surround the Arafura swamp, it dwindles rapidly to a small creek and then opens out in a great low-lying dry swamp bed through which we travelled for days. Here we threaded our way among glades of swamp tea-trees,[3] our footfalls muffled by the green sward of grass and dry peaty loam. This green park-like valley formed a striking contrast to the bare arid country nearer the coast, and to some of the barren, rocky terrain that we were to meet during the latter part of the journey. Away to the east, south and west, rugged hills and rocky outcrops showed in sharp relief above the low-lying swamp bed wherever we could see to the horizon. The natives informed me that although this great basin was now dry, towards the end of the "wet" it became a big swamp, into which

[1] The first two parts of Dr. Thomson's paper have already appeared in this *Journal* (112 (1948) 146–64 and 113 (1949) 1–8).

[2] This river still appears on official maps of the area as the Goyder. See appendix.

[3] These trees, chiefly *Melaleuca leucadendron* var. are capable of growing in swamp land or land that is inundated for several months of the year, protected by their waterproof paper-like bark, from which the popular name of "paperbark" is derived.

they journeyed in bark canoes of a curious type called *ngardän* quite distinct from those used on the coast and in the river estuaries. I was greatly interested in these tales and resolved to investigate them later, for the area promised to be of interest geographically and the tangled river-systems were but poorly represented on the only maps available.

After four days' hard travel in which we covered about ninety miles, the park-like country gave place to uplands and we ascended a series of low, rough, stony hills over which travel was difficult and slow. We threaded our way through these hills over the watershed of the Koolatong river and down to Blue Mud Bay. From time to time we met with natives of the Ritar'ngo and other inland groups, sometimes in little hordes, at other times in family parties consisting of a man and his wives and their children; occasionally just a hunter or two, their faces and bodies smeared with grey mud or clay so that their quarry—red kangaroo or wallaroo—would not "smell" them.

Each man carried a neatly made parcel of a special kind called *tabarr* containing bones. These bones, of such birds as the Jabiru, the Emu, or the "Native Companion," or even the long bones of the kangaroo, are called either *kälngboi*, if the animal is killed by a young man, or *tjärnbin* if they have been accumulated for ceremonial purposes. The bones are generally intermingled with a number of firesticks. In their right hands the hunters carried a spear-thrower and a bundle of spears; hooked wooden spears with villainous-looking barbs perfectly carved from ironwood, or stone-headed spears, *ngambi*, from the famous quarry at Ngillipidji in the hills of the blue distance—which no white man had seen. I had long known that the quarry was remote for very few, even of the oldest men on the northern coastline, had ever been there although they knew and cherished lovingly the flint spearheads.

For days we walked towards a line of low, rugged rocky hills that disappeared into a blue haze on the far horizon. Each morning we marked such a line of hills and made it our goal, but at evening when we reached its rocky summit, we looked out again on line after line of hills beyond.

It was the hottest time of the year, the season called by the natives *worl-mamirri*, literally "with thunder," or *ngorro wältjän*—"the nose (threshold) of the rains." The days were scorching hot and our fingers became taut and swollen as we walked, our lips dry and parched; the land shimmered under a mirage that was with us always. We broke camp very early and were on the way soon after daylight. At midday we called a halt and lay down in the shade near water if any was to be found. The flies crept into our eyes, mouths and noses with such persistence that they intensified the discomfort of the heat during the day and of the mosquitoes at night. Flinders was similarly plagued by the flies in the Gulf of Carpentaria: "the common black flies, from their extraordinary numbers and their impudence, were scarcely less annoying than musketoes; they get into the mouth and nose, and settle upon the face or any other part of the body, with as much unconcern as they would alight on a gum tree; nor are they driven away easily."

Some three months had elapsed since my last visit to Blue Mud Bay and the people were very glad to see me again and proud of having kept their promise to maintain peace in their country, for no fighting had taken place on

*A camp in the trees*

*Tutjero, a flint worker at Ngillipidji*

*The finished spear head which is then wrapped in paper-bark*

the entire coastline since our departure. Important totemic ceremonies were then taking place and two or three hundred natives were in the camp at Mätarauwaitj. I was able to attend these ceremonies, and I visited the burial place near the Koolatong river where the bodies of the dead are exposed for the purpose of cleaning the bones before they are ceremonially presented to their relatives.

*Ngillipidgi flint quarry*

After remaining for some days in this camp to rest, I gathered together a party of natives to act as guides and carriers and set out for Ngillipidgi in the hills close to the Walker river, which is renowned throughout the whole of eastern Arnhem Land as the quarry where the fine stone spearheads and knives are manufactured. For generations they have circulated over a vast area and I have seen the spearheads in use as far south as the Roper river and northward to the Goyder as well as at Caledon Bay. The journey to Ngillipidgi, which lies some 40 miles inland, and back to Mätarauwaitj occupied four long days of travel, but I felt greatly privileged to see with my own eyes the quarry that had acquired an almost legendary renown.

At Ngillipidgi the stone is not quarried from a face of rock as I had expected, but from the open ground where a big overburden of earth had been removed to expose boulders which were levered out, or fractured by the use of fire, into pieces that could be handled. The quarry covered many acres of ground and must have been in use for centuries, great heaps of chips and broken or rejected flints marked the sites of old working places. The actual manufacture of the flints is carried out with only a pounding stone of quartzite and requires a great deal of skill and experience. Only two or three old men considered skilful enough to make the fine heads and knives remain at the quarry to carry on the craft. We were fortunate in finding one of the most renowned of them there, and I obtained a series of still photographs and a cinematograph record. Out of hundreds of flints struck off, all but a dozen or so would be rejected, the finished flints, each wrapped separately in a sheath of bark, are tied in bundles of a dozen or two. These fine flint heads, which are used not only for the tipping of spears but also for fighting picks and the knives which are still used in circumcision, are the chief objects or *gerri* (goods or wealth) in one "quarter" or *kumur* of the remarkable ceremonial exchange cycle which has been developed in Arnhem Land and is the means by which material possessions circulate over vast distances. The bark sheath in which the *ngambi*, stone spearhead, is encased is called *djalk*, and this gives its name to *kumur djalk* the "quarter" in which these flint spear heads form the most characteristic object. This ceremonial exchange cycle is the subject of a monograph now in the press.[1]

*The Tree-dwellers of Arnhem Land*

The most interesting and important geographical result of this expedition was the discovery and exploration of the great unmapped Arafura Swamp, 500 square miles in extent, and of a group of people in this area who have

[1] D. F. Thomson, "Economic structure and the ceremonial exchange cycle in Arnhem Land," Melbourne (in press).

developed a remarkable culture. Living as they do for a part of the year in the swamps to hunt the Semi-palmated or Magpie Geese and collect their eggs, they become tree-dwellers, cooking their food and sleeping, like gorillas, on crude platforms built in the branches of trees standing in the water, for there is no dry land.

During the wet season of 1935–36 I had been away from the area, but when I returned the natives told me that the rains had been very light and that the geese had not nested that year. This augured well for the next "wet," and in 1936–37 I arranged my work and patrols so that I should be in the vicinity of the Glyde river at the critical time. Towards the end of the rains the natives began to bring in reports that conditions in the great swamps were favourable, the flood waters were rising, the "water-grass" (*Molina caerules*) was high and the geese were beginning to mate and to trample down the long grass that forms the foundations of their great nests.

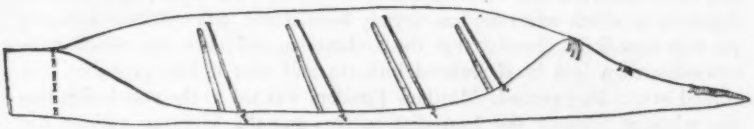
After negotiating the bar at its mouth, I took the *St. Nicholas* as far up the Glyde river as I thought safe, but encountered conditions dangerous for the vessel. At high water the river had been a wide, slow-running stream, but a few hours later the tide had fallen rapidly and we found ourselves between two walls of sticky, villainous-looking grey mud in a river-bed now reduced to a narrow raging torrent, and so far below the banks that we could see nothing at all of the surrounding country. The water was of a dark muddy colour, thick with logs, trees and other debris which was being swept towards the sea. The channel was now far too narrow to turn the boat, and I could only stand by and wait for the next tide to move her to safety.

The following morning I swung the boat on the full tide and took her down the river to a safe anchorage, and then returned upstream. My efforts were rewarded, for I found that not only was the whole country through which we had walked the previous year converted into a great swamp, but that the natives did in fact journey in bark canoes into the swamp in quest of geese and their eggs. I accompanied them on two occasions and obtained photographic and cinematographic records of these remarkable people. Only the men took part in these excursions, the women and children meanwhile remaining in the camps on the dry land at the margin of the swamp.

Mosquitoes are present in millions, making the long hot nights almost insupportable, and the swamp-dwellers construct a special type of house, beehive-shaped like those of many other parts of Arnhem Land, but thatched completely with a dense outer covering of grass. The only openings are one or two low doorways, so small that the hut can only be entered by crawling on the ground. At sundown the natives retreat into these "wurlies," plug the entrances with grass to exclude mosquitoes and light smoke fires within, making a hole in the roof just large enough to allow the smoke to escape. I had proof of the ravages of the mosquitoes on the Glyde river when my kangaroo dog Tiger was exposed for only one night on the open deck of the *St. Nicholas*. In the morning he was in a terrible condition; his coat was staring and covered with gorged *Anopheles* mosquitoes so distended with blood that it exuded in drops like beads from the ends of their bodies. The deck of the vessel had the appearance of having been sprayed with blood

through a fine jet. From that time Tiger slept inside the native huts or he could not have survived.

The long journeys with the goose-hunters, and their camps in the upper branches of the trees, were the most remarkable experiences of the years that I spent in Arnhem Land. Towards evening the hunters began to look for trees suitably situated and with forks which offered support for their sleeping platforms. The platform, called *mākārnbi* by the Djinba and Wulläkki—the principal goose-hunting clans—is a frail and somewhat crude affair, made by wedging three or four poles in forks suitably situated and laying sticks across to form the floor which is covered with sheets of tea-tree bark. No lashings or fastenings of any kind were used, and one had to learn where to place one's weight and be careful to avoid upsetting the platform by walking too close to the edge. Fireplaces were made on the sleeping platforms by plastering the bark with a thick coating of sticky blue mud from the bottom of the swamp, for fires are needed to cook food and to give some protection from mosquitoes. When firewood is required one must climb out along a branch and break off the dead sticks within reach. When this supply is exhausted someone must crawl backwards over the edge of the platform, descend the tree-trunk to the



*"Ngardän," the bark canoe of the goose-hunters*

canoe moored below, pole across to a neighbouring tree, climb for the required wood, and repeat the entire performance on the "homeward" journey. The difficulty of obtaining sufficient wood to maintain smoke fires makes it impossible for the natives to sleep much during their journeys in the swamps, which are therefore of short duration. For the most part they sit huddled round their fires all night, beating themselves constantly with goose wing fans. When, laden with geese which are half cooked to preserve them, they rejoin their women folk they make up for some of the sleep they have lost, in the security of the special houses thatched with grass, and satisfy the craving for vegetable food which results from a diet of geese and eggs. The bark canoes, called *ngardän*, are allowed to dry out and harden before they set out on another expedition.

It was an unforgettable experience to sit looking across the park-like expanse of the swamp and see from one's sleeping platform the sun rise or set over the water, or watch the long file of canoes converge at dusk on the prearranged camping place, bringing in their spoils. Unforgettable too the scene at night; the glimmer of camp fires high up in the trees, or reflected in the dark waters of the swamp below, and the talk of the natives as they plucked and cooked the geese. They recounted and lived over again the day's adventures recalling critical moments in the stalking of the quarry they had killed or lost.

Towards the end of the goose-egg season, the water in the swamps begins

to recede, the vegetation breaking down and becoming very dense. This impeded our progress but eventually we reached the boat, worn out with hard travel, lack of sleep and the ordeal by leech and mosquito. Our skins were cut with the sharp "cutting grass" and were rough, dry and scaly through long immersion in water. To add to our difficulties, my equipment was beginning to show the strain. The cameras were constantly developing faults. Sometimes shutters jammed, and the cinematograph camera would stick at critical moments and I had often to remove lengths of spoilt film to free the motor, the efficiency of which was not improved by days in the humid swamps. Each night I had to empty and reload magazines under my blankets in the tree-tops, storing the exposed film in dry tea to keep the moisture out, a towel round my forehead to keep the sweat from dropping on to the film.

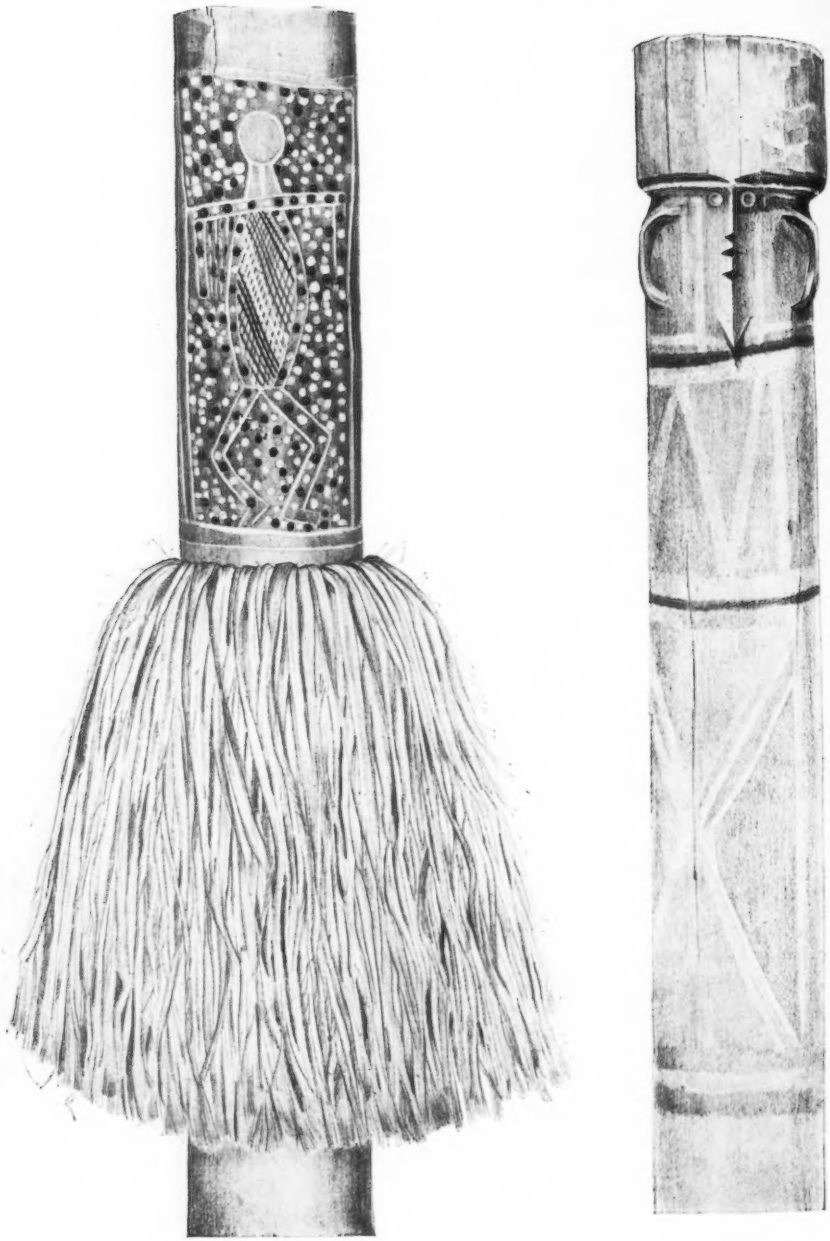
*Indonesian influence*

An important and unexpected result of this expedition was the discovery of the extent of Indonesian influence in Arnhem Land. The fact that some contact with Malay or Macassar visitors had taken place on the coast of Northern Australia was evident, and is revealed in the reports by Matthew Flinders to which reference has already been made. But evidence collected on this expedition showed that the Indonesian influence was much more extensive than had been realized hitherto and that it had probably continued over a long period. Matthew Flinders was led to the conclusion that the relations between the Australian natives and the Macassar visitors was not very amicable. At his first meeting with the fleet of *praus* from Macassar he was warned that they sometimes had skirmishes with the natives and Pobassoo cautioned him to beware of them. And again, in a note which I have already quoted, Flinders suggested that the behaviour of the natives at Woodah Island in Blue Mud Bay may have been due to their having had differences with Asiatic visitors for whom they entertained little respect.

The Macassar visitors came to Arnhem Land each year with the north-west wind and returned home, after working for a few months, with the south-east. According to the natives they came in fleets, often touching at North Goulburn Island, which they called *Dawulingo*, and thence dispersing along the coast to their regular fishing grounds. It was their practice to establish shore stations, laying up their praus during the storms of the north-west season and fishing for trepang with the dugout canoes called *lippa lippa* (apparently a Bugis word) of which each prau carried about eight or ten. These Macassar camp sites are scattered along the coast of Arnhem Land at least as far south as Blue Mud Bay and Groote Eylandt. Flinders recorded finding the remains of such a camp in the Pellew Group off the mouth of the Macarthur river in the south-west corner of the Gulf of Carpentaria. The camp sites are generally marked by splendid groves of Tamarind trees (*Tamarindus indicus*) and occasionally by stone fireplaces at which the trepang was smoked. The natives state that the Macassar trepangers returned again and again to the same fishing grounds.

The Macassar seafarers established a good working relationship with the natives and have left behind a tradition of respect which the white man in his

*A dugout canoe*
*"lippa lippa"*



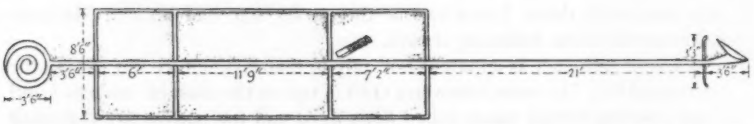
*Carved and painted grave posts. "Markukan" (left). "Wuramo" (right) showing Indonesian influence*

subsequent dealings with the natives has never been able to inspire. They recognized the native ownership of the land and the surrounding waters, and paid tribute to the members of the local clans for the fishing rights. There is little doubt that the failure of the white man to recognize or respect native custom and native rights and land ownership have been responsible for much of the trouble which has arisen in the area. The natives of eastern Arnhem Land do not trade their women and this bears out their statements that the Macassar men respected the women and did not interfere with them—for interference with women has been the most fruitful cause of the trouble. The Indonesian visitors not only gave place-names to the principal camp sites which they occupied and to other parts of the coast, but also gave personal names to the headman among the aborigines with whom they worked. These names have been handed down from father to son and in many cases are still used. The vocabulary learned from the Indonesian visitors was extensive and even to-day the people remember much of the language brought by the visiting seafarers, which appears to contain many Bugis words. When the praus were about to return to Celebes after the fishing season, the visitors made many presents to the natives: canoes, calico, axes, knives, fish-hooks, tobacco and other objects of wealth. Occasionally an Arnhem Land native went back with them. I met two or three men who had been to Macassar and returned in the following season.

Macassar influence is apparent not only in material culture but also in the ceremonial life. The most important craft in use on the coast of Arnhem Land is the wooden dugout canoe called *lippa lippa* and the natives say that until the Indonesians brought them to Arnhem Land, and also the iron with which to cut them, they possessed only bark canoes. The smoking pipe *lungin*, used universally in this territory, is also of Macassar origin and carved wooden grave posts, which are quite foreign to the Australian culture but which bear a strong Indonesian character, were seen on graves (*molo*) of the Kumait people and certain other groups of the Yiritja moiety, particularly the *Wărramirri* in far north-eastern Arnhem Land. While rope manufactured by the aborigines is normally of only two strands or of multiples of two, a three-strand rope for dugong and turtle fishing is manufactured by a special technique in north-eastern Arnhem Land and there is little doubt that this technique too was introduced by the Macassar visitors. The natives not only obtained iron from the Macassar voyagers but became adept in the manufacture of knives and long spear-heads, beating the iron out cold (for they never learned to heat it) with the skill of expert metal workers. They make spears from scraps of iron, rigging screws and propeller blades, and axes from the water tanks and trepang boilers of fishing craft. Even water pipe is used, flattened and split, each half then beaten out to make a fine leaf-like blade. A great deal of work was lavished on the shaping of some of these spears which were dedicated ceremonially to one of the sacred clan totems. They were then *yarkomirri* (literally "having a name"—*yarko*, name, *-mirri*, with) and were sacred. Even the game that was killed with them was sacred and might be partaken of only by men to whom the totem to which they were dedicated had been revealed, never by women or children.

Calico, fabric and other articles of material wealth introduced by the old

voyagers from Indonesia were called by the collective term of *muadāk*, and gave impetus to the remarkable ceremonial exchange cycle which supplies the mechanism, the driving force, for a great circulation of wealth which involves objects from hundreds of miles of territory. (See page 55.) The strong Indonesian influence throughout north-eastern Arnhem Land suggests that the visits of these Malay voyagers began much earlier than Matthew Flinders was led to believe, and the study of this influence sheds much light on the way in which elements of an invading culture are absorbed. In each case, before any element of culture, whether social or material, is adopted, it must be fitted into the pre-existent culture pattern and given a place in mythology which, since this is believed to be the direct record of the doings of the totemic ancestors, gives a charter for its adoption. One of the most remarkable of the objects left by the Macassar visitors is a square-faced gin bottle which was elevated to the level of a ceremonial totem in the Mildjingi clan of the Lower Glyde river area. To-day a replica of the bottle, called *butolo*, is carved from solid ironwood, and bears a geometric pattern which represents clouds called *mängän*, said to have been reflected on the bottle as it was found drifting in the water. The elevation of this bottle to the rank of a



*Plan of a ceremonial ground "mikārn munata" representing the deck and anchor of a Malay prau*

sacred ceremonial totem stresses the attitude adopted towards the invading culture. Small wooden anchors a few inches in length with a single fluke, called *mikārn*, and strongly resembling the wooden anchors of the Malays, are used by certain groups for ceremonial purposes. Representations or *mälli* (shades, ghosts) of the anchor and rope as it lay coiled on the deck of a prau are used by the Kopapoingo-speaking people of Birkilli at Arnhem Bay and by one or two allied clans. For certain ceremonies, elaborate ceremonial grounds of large size are outlined, or built up in the soft ground, the margin being surrounded with white sand. One of these grounds, called *yaindja*, represents the deck of a Macassar prau (*mitjiäng*), complete with anchor, the mooring line coiled neatly at the stern of the craft. In the body of this ceremonial ground a grave post of a type called *wuramo* was erected and represented the *mälli* ("shade") of a person for whom the ceremonial was held. This ground is used by certain groups of the Yiritja moiety only, the mourning and purification ceremonies following the death of a member of the clan.

The use of the anchor in each of these cases is symbolic, for there is little doubt that the raising of the anchor by the trepang fishermen when their ships were about to leave for *Yumainga* (the legendary home of the Malays) became a symbol for departure, and that the *mälli* of the Macassar anchor (its spiritual essence, its manifestation) thus came to symbolize the departure of the spirits to the bourne of the dead. A small wooden anchor is carried

by a messenger to muster people for a funeral ceremony and also in the ceremonial capture of women. In this ritual capture the anchor is hooked in the hair, and the woman is believed to be powerless to resist; held, not by the small anchor and its cord, but by the *mälli* (the spirit, the *marr*) of the Malay mooring line, which held the ship in former times. Carved wooden grave posts, called *wuramo*, are said by the natives to have been placed by the Macassar seafarers on the graves of men who died when the fleet was on the coast. These *mälli* were regarded as guardians of the graves over which they were set, and were called *kon yikki-mirri* (hand with knife), for they were believed to brandish great knives. Indonesian influence and infiltration are linked with stories of the dog and the whale. This "dog" is now fitted by the natives into their own myth pattern and has come to be associated with the dingo, but the effigy which forms the central figure in the spectacular pageant associated with it bears unmistakable evidence of external influence.

*"Mikärn," a model of a Malay anchor*

In conclusion I wish to record my special thanks to Raiwalla of the Mildjingi clan and to Kapiu Gagai, seaman, of Badu, Torres Straits, who stood by my side in peace and war and whose integrity and devotion have been an inspiration. My sincere thanks are also due to the Rev. T. T. Webb and the late Mrs. Webb and to Mr. and Mrs. H. U. Sheppardson, of the Methodist Mission at Milingimbi, for their hospitality and kindness.

## APPENDIX

*Climate and topography*

To those who have seen Arnhem Land only from the air, the country presents a barren, desolate, almost forbidding appearance, though it is by no means the inhospitable territory of popular imagination. Much of it lies close to the equator, between the eleventh and fifteenth parallels of latitude, but coral-fringed islands, beaches with waving coconut palms, and dense, luxuriant, vividly green forests are conspicuously absent. There are indeed a few areas of true jungle or rain-forest association but they are of limited extent and chiefly along the rivers. Inland, the country has a character peculiarly its own. This is due to a large extent to seasonal and climatic factors. There are two well

defined seasons, the wet and the dry, characterized respectively by the north-west wind, *bara*, and the south-east wind, *dimoru*. These seasons, climatically very distinct, play an important part in determining the type of vegetation of the area, its fauna and even the movements and occupations of the natives whose food supply is necessarily seasonal.[1]

The annual rainfall of Arnhem Land is about 41 inches, and this, apart from the fact that it is concentrated in only three or four months of the year (December to March), would be insufficient to support a truly tropical vegetation, such as flourishes in full luxuriance in regions with a rainfall of 100 inches or more. The wet season ends about March, and during the remaining eight months of the year, from April to November, rain seldom falls except in the hilly country around Melville Bay, Cape Arnhem and Port Bradshaw. Here there is actually a good deal of rain during the dry season, and the vegetation, especially along the water courses, bears more of a rain-forest character and is less markedly xerophilous than in many other parts of the territory.

In a few areas such as the vicinity of Caledon and Buckingham Bays, parts of Cape Wilberforce, and on off-lying islands such as the English Company's Islands, the Wessels and parts of Groote Eylandt, rocky outcrops occur on the coast. At Caledon Bay there are outcrops of granite, but most of the rock is sedimentary; on Napier peninsula there are high cliffs of stratified rock. Farther to the west, from the head waters of the Liverpool river to the sources of the East and South Alligator rivers, the country rises in a series of high rough tablelands with stratified rocks fissured and intersected in all directions by deep gorges and ravines, in many of which there are permanent pools of clear water. The general appearance of this country, which extends for hundreds of square miles, with its bare exposed rock faces and glens, is one of barrenness and desolation. Even to-day, much of it has never been traversed by the white man. But generally the coast of Arnhem Land is low and fringed by vast flood plains like the wide plain through which the Glyde flows in its lower reaches. These plains often extend inland for miles and are intersected by salt-water creeks which ramify in all directions. The waterways and the estuarine reaches of the rivers are fringed with a dense, almost impenetrable wall of mangroves, and farther out on the plains with "Beadbush" (*Salicornia*). During the wet season, and often at very high "king" tides, the creeks and waterways overflow and the plains are flooded for miles, becoming a sea of mud difficult to traverse even on foot. But during the dry season these plains dry out, the cracked and fissured surface producing a crazed or tesselated appearance. Inland, the salt pans and coastal plains give way to broken, undulating, often slightly hilly country, but although it is rugged there are no high ranges and the hills and plateaux seldom exceed 500 or 600 feet in height. From the mouth of the MacArthur and Roper rivers and across the Rose river to Bennet Bay, the country is very low-lying and when the surface waters have evaporated it is hot and arid.

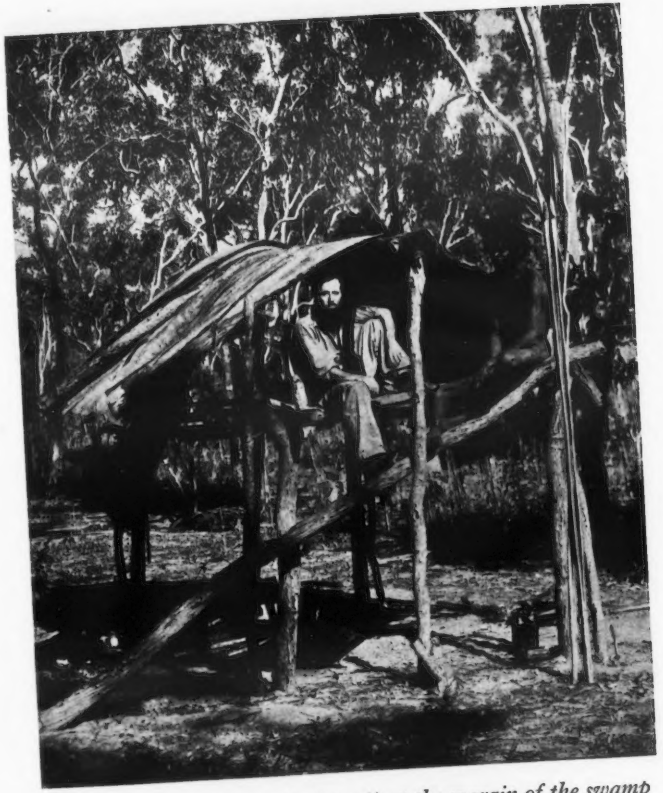
The largest rivers are the Roper and its tributaries the Hodgson and Wilton, which drain a vast area to the south, and the East Alligator which flows west into Van Dieman Gulf. In the north, the chief rivers are the Buckingham, the Goyder or Woolen, the Glyde which flows into Castlereagh Bay, the Liverpool and the King. These rivers conform very much to one pattern. They rise among the hills as a series of small creeks which flow swiftly and in the rainy season carry a large volume of water, so that during the height of the "wet"

[1] See note on seasonal influence and seasonal life table in the second part of this paper. *Geogr. J.* 113 (1949) 1–8.

*Evidence of Indonesian influence. The dog totem of the Mildjingi clan*

*Ceremonial ground with representation of Malay anchor and mooring rope*

*Bark canoes in a waterway of the Arafura swamp*



*The author in a "mosquito house" at the margin of the swamp*

the main stream may swell to the dimensions of a raging torrent some 40 or 50 feet deep which overflows its banks and spreads out over the surrounding country for a mile or more. When the wet season ends the floods subside rapidly and many of the rivers are reduced, a few miles from their estuarine reaches, to thin trickles or water flowing through a sandy bed at the bottom of a ravine between steep banks. The banks may be 20 or 30 feet high and are cut deeply when the stream is in flood. In their upper (freshwater) reaches, these river courses are fringed with fine Paper Bark or "Tea" trees interspersed with *Pandanus*. So characteristic are the patterns of vegetation in Arnhem Land, that from the air, even at a height of several thousand feet, the country can be classified almost at a glance.

The doubt as to the identity of the river systems in the area was finally cleared up by these patrols and by subsequent journeys in the auxiliary ketch *St. Nicholas*. On the overland journey we were able to establish definitely the fact that the Glyde, and not the Goyder, drains the Arafura Swamp, which lies in a vast basin surrounded by low rocky hills. The work carried out on these journeys was confirmed later by aerial reconnaissance in 1937. On the Admiralty Chart (1044) the river which flows into Castlereagh Bay *via* Glyde Inlet is shown as the Glyde, but in official maps issued by the Commonwealth Property and Survey Branch, Department of the Interior (1934) and the R.A.A.F. Aeronautical Map (1945), Sheet D.6, it is wrongly called the Goyder, while the river which enters the sea at Banyan Island to the east of the Glyde Inlet, at the western end of Howard Island, is named the Woolen. The Goyder river lies much farther to the east than is indicated on existing maps. Its source does not lie to the south of Banyan Island but close to the south-western extremity of Buckingham Bay, which extends considerably to the south-west of its charted position (Admiralty Chart 1044).

[The author has proposed names for new features mapped by him and these are shown with an asterisk on the folding map accompanying this paper.]

*Plant and animal life*

As has been stated above, the territory between Melville Bay, Cape Arnhem and Port Bradshaw differs considerably from other parts of Arnhem Land owing to the frequency of rain during the dry season. Here the country which I explored on foot in 1935 and 1936 and again in 1942–43, is very rough and broken, with rocky hills and low tablelands intersected by deep ravines. Freshwater springs are numerous and, in contrast with other parts of Arnhem Land, many of the creeks flow throughout the dry season in deep narrow gorges fringed with cabbage palms (*Livistona*), thickets of Pandanus, and other tropical vegetation. The plains fringing the lower reaches of these rivers are clothed with a dense, heavy growth of Blady or "Kunai" grass (*Imperata cylindrica*) which grows to a height of 6 or 7 feet and often covers many square miles, as on the flats between the Peter John and Cato rivers on the eastern shoreline of Arnhem Bay which we traversed in July. During the wet season it is impenetrable, but early in the dry season the natives burn these vast grass flats systematically, spearing the wallabies and capturing other game which they harbour, especially bandicoots, snakes and "goannas" (*Varanus*). The burning of the grass destroys many mosquitos and reduces the danger from venomous snakes, which include the deadly Taipan (*Oxyuranus scutellatus*) called *Obarko* by the natives. For the remainder of the year the plains are bare and open and travel is easy. When the rivers subside after the "wet," a few deep permanent waterholes and "billabongs" remain. These often form chains of lagoons which are generally situated a little distance out from the main courses of the rivers; they

are also dotted throughout the country. The lagoons are frequently covered by a dense growth of waterlilies (*Nymphaea* sp.) with white and blue flowers and their seed capsules and roots form an important food supply during the "dry." The lagoons teem also with fish and water birds such as Magpie or Semi-palmated Goose, Pygmy Goose, Black Duck, Jabiru and the Native Companion; the Jaçana or Lutus Bird, stepping over the waterlilies with its long slender toes, adds an exotic touch.

Most of the country is clothed with bush or savannah woodland composed of the Stringy-bark (*Eucalyptus tetrodonta*) called *Kardaika* by the natives. The bark is used by the natives for thatching houses, for making bark canoes and food and water vessels, and for many other purposes. This Stringy-bark forest may carry a strong admixture of Cyprus pine (*Callitris*), Bloodwoods (*Eucalyptus* of various species), Ironwood (*Erythrophloeum Laboucherii*), *Livistona* palms and *Acacias* (wattles). *Grevillea* of several different species sometimes intermingle with the Eucalyptus. The whole area is covered with a more or less luxuriant growth of grass. Along the rivers and on the coast Pandanus or Screw Pines are abundant, and in a few favoured localities, chiefly in sheltered pockets among hills or along the course of large rivers, patches of true tropical jungle occur. Here great rain-forest trees, palms, birds' nest ferns and orchids grow in profusion. Huge spreading Banyan trees (*Ficus infectoria* and others) may cover almost half an acre of ground with their spreading branches and aerial roots. These Banyan trees are a boon to the natives. Not only do the slender aerial roots yield a strong, durable, reddish-brown fibre from the bast next to the cambium layer, but the trees attract large numbers of fruit pigeons, and the large white Torres Straits or Nutmeg Pigeon, which are greatly relished. In the jungle, as well as in the open forest country, many of the trees and shrubs yield edible fruit, but these are strictly seasonal, and as a rule the harvest of any one species lasts only for a few weeks. Not only do they provide an actual food supply, but like the Banyan trees they are a rendezvous for game such as emus, which are more easily approached at these feeding places, and may be stalked or speared from ambush by a native concealed in the leafy branches above.

Fish are abundant in the rivers and coastal waters and game is plentiful, but its capture requires a thorough knowledge of natural history, and often the use of a specialized technique which has been developed in adaptation to local conditions.

Two species of crocodile occur in Arnhem Land. The lower reaches of the rivers form the home of the big Estuarine Crocodile (*Crocodilus porosus*), which however also go into fresh water, especially to breed, in the wet season. In the deep permanent island lagoons, another and smaller species, Johnstone's [1] Crocodile (*Crocodilus johnsoni*) is found. It rarely exceeds 7 or 8 feet in length and is easily distinguished by its long, narrow snout in contrast with the broader, blunter muzzle of the Estuarine Crocodile. Johnstone's Crocodile is a fish eater and is harmless to man. Looking down from a high rock overhanging their pool, I have often seen these interesting little reptiles basking on the surface of a Pandanus-fringed waterhole where they sun themselves with legs outspread like lizards. The big Estuarine Crocodile sometimes attains a length of more than 20 feet, but few of the specimens seen exceeded 14 or 15 feet, though even these reptiles often had an enormous girth and weight. Like the smaller Johnstone's Crocodile, their

[1] This small harmless Fresh-water Crocodile or Johnstone's Crocodile was named by Krefft (*Proc. Zool. Soc.* 1873, p. 334) after R. A. Johnstone, Sub-Inspector of Police, who obtained it in the Herbert river District, Queensland. The specific name was incorrectly spelled in the type description which accounts for the inconsistency.

*Plains and mangrove-fringed waterways south of Buckingham bay*

*Towing bark canoes through the Arafura swamp*

*Coastal plain near Cape Stewart after the break of the rains*

*A Pandanus thicket in the wet season*

chief food consists of fish, but they also eat wallabies, dingoes and many other animals, including horses and cattle when they catch them off their guard and drag them into the water. Although they generally move slowly on land, these great reptiles are capable of astonishing speed if they are alarmed or when they are attacking. They rely on a lightning lash of the tail to throw their prey off its balance.

With the first rains that herald the wet season, the females move upstream to deposit their eggs. These are about the size of a duck egg and have a white shell like porcelain with a somewhat greasy texture. The female crocodile constructs a great incubator nest of vegetable matter which she scratches into a mound, the heat of decomposition supplying the warmth needed to incubate the eggs. Meanwhile she remains on guard in the vicinity of the nest, and at this time is dangerous and aggressive.

The flesh of the crocodile is relished by the natives, who roast it in "ovens" buried in the ground, using hot stones or pieces of termite mound. The best meat is the thick muscular portion at the base of the tail and this tastes very like the flesh of a large fish.

A number of other reptiles are also eaten and form an important supplementary food supply. These include several snakes, chief of which are the Carpet Snake (*Python spilotes*), the Scrub Python (*P. amethystinus*), two species of Rock Snake (*Liasis fuscus* and *L. olivaceus* known respectively as *wititj* and *mundukul*, and a number of water snakes, including the curious Javan File or "Elephant's trunk" Snake (*Acrochordus javanicus*). This derives its name from the rough rasp-like texture of skin which is soft and rather flabby. During the dry season the natives swim in the lagoons, organizing "drives" to comb each waterhole systematically. They swim under water, using small nets and spears and feeling in the weeds with their hands and feet. In this way they capture fresh-water snakes, especially *Hypsirhina polylepis*, closely allied to MacLeay's Water Snake of Eastern Queensland streams, and water tortoises of two species, chief of which is *minälla*, the Long-necked Tortoise (*Chelodina longicollis*). The eggs of all these reptiles, as well as those of both species of crocodile and of the "goannas" (*Varanus*), and on the coast, the eggs of the sea turtles, are eagerly sought by the natives. But the eating of eggs at certain periods, and at critical stages in a man's relation to society, is prohibited, and the prohibition enforced by severe tabus with danger of ritual punishment. Raiwalla, the great fighting man who accompanied me throughout the period I spent in Arnhem Land, would not eat eggs, particularly the eggs of the emu, because he believed that if he did so his legs would flex the wrong way and he would lose the nimbleness and sure-footedness on which he prided himself.

In the bush, the chief mammals, the principal food-animals of the natives apart from reptiles, are kangaroos, opossums, bandicoots, native cats (*Dasyurus*) and two or three species of rats. At least five or six species of kangaroo are found in Arnhem Land. These are the Agile Wallaby (*Macropus agilis*) called *werti*; the Red Kangaroo, *kärritjämbäl*; the Wallaroo, *murrpungula*; the Rock Wallaby, *kändauwal* (of several species) and the little Nail-tailed Wallaby. Each of these has its own distinctive and restricted habitat, is known to the natives by a specific name at each stage in its development, and has a special season in which it is most easily hunted, as well as a distinctive technique employed in its capture. Each also has its own specific symbol in the gesture language used by the hunters.

The Agile Wallaby is found on the plains and grasslands, especially in the dense scrub and rank grass fringing the rivers and creeks and in the savannah bushland. It is stalked and killed with spears, driven by organized parties with

dogs and killed from ambush, or captured by skilful and systematic burning of the grass. The big Red Kangaroo is found in the more open savannah country where ironstone ridges occur and especially where there is red gravelly soil. Whereas the Agile Wallaby, although it is found in incredible numbers on some of the river flats, is a solitary animal, the Red Kangaroo is gregarious and lives in mobs consisting of twenty or more animals of mixed sexes and various ages. The greatest skill is required in stalking and approach. Sometimes the hunters plaster their faces and bodies with grey clay or with mud, not merely to render them less conspicuous but chiefly to prevent the quarry from smelling them. The *kärritjämbäl* is most easily approached at the beginning of the north-west monsoon when the great winds cover the sound made by the approach of the hunter. Its flesh is much valued, and the eating of this meat by men and women at any critical period in their lives is restricted by tabus, which must be strictly observed for they fall under "supernatural sanctions." This means that failure to observe them may be visited by ritual or supernatural punishment and bring a dire visitation to the individual, or even ritual "bad luck" to the entire group of which he or she is a member. Elaborate ritual and magic is associated with each stage in the hunting of the *kärritjämbäl*, and prowess in the killing of this and other important game confers on the hunter the coveted title of *tjämbait*. To hear himself referred to as *tjämbait* is one of the greatest distinctions that can be attained, and to acquire renown as a hunter, in a community where every man lives by his spear, is no mean achievement. This signifies in Arnhem Land not only that the man is skilled with his spear, but also that he must have observed the onerous tabus without which his skill as a spearman would have been wasted. If he did not scrupulously observe the ritual associated with mourning, for example, he could not approach the game.

As the hills are approached and the country becomes broken, with outcrops of big stones, the Wallaroo, *murrpungula*, is found. He is essentially an animal of the rocks and boulders, where he sleeps all day, descending to the foothills to feed at night. To see these massive smoky-grey or reddish-brown animals lumbering home among the rocks in the early morning is one of the grandest sights in the north. The Wallaroo is less alert than the *kärritjämbäl*, requires less skill in stalking, and is not surrounded by so many, or such severe, tabus and it is not so highly prized. In the rocks and crags of the hilltops and the rocky cliff ledges along the coast, the Rock Wallaby, *kändauwal* (*Petrogale* sp.) is at home and is shy and difficult to approach. When disturbed it seeks refuge in deep clefts or crevices in the rocks, but sometimes when surprised by the hunters it may in sudden fear resort to a less inaccessible spot from which it may be driven by smoke. When stalking the *kändauwal*, the hunter employs the ruse of throwing stones on to the rocks above the animal in order to distract its attention from the real direction of the danger, enabling him to approach meanwhile within spear range. Rock Wallabies are infested with lice and consequently are constantly scratching themselves, and the scratching of the ribs with the hand is the gesture used by the natives to denote *kändauwal*.

The smaller mammals, of which the chief are the Bandicoot, Brush-tail Opossum (northern dwarf variety, *Trichosurus vulpecula arnhemensis*) and, less important, the Native Cat (*Dasyurus hallucatus*), as well as a number of large arboreal rats, are captured incidentally, while travelling, rather than by drives specially organized for the purpose. In rocky country *tjirrmänga*, the Echidna (*E. aculeata*), is located by dingoes in rocky cliffs or fissures in the rocks, or in holes in termite mounds. Being fat the flesh is greatly relished.

The Bandicoot, *wangura*, is very numerous wherever there is plenty of grass cover, especially on the banks of the streams and on the grassy plains. It builds a loose untidy nest which, though roughly domed in shape, is little more than a

heap of grass inside which the animal lies. When disturbed it breaks through the wall at any point and makes off swiftly. To capture these animals the natives jump on the nests or drive a spear through them before the animal has time to get away. When chased by the dogs, bandicoots often seek refuge in hollow logs or trees from which they are cut out with tomahawks.

The Northern Native Cat (*Dasyurus hallucatus*), which is common in this territory, is often driven into trees by dogs and then speared. The big Lace Lizards or Monitors known throughout Australia as "goannas" (a corruption of the name Iguana, properly applied to a very different reptile), of which several species are found in Arnhem Land, make holes or burrows in the ground. They are dug out by the natives, or driven by the dogs into trees, where they are killed with spears.

On the coast turtle eggs form an important source of food at certain times of the year and the natives living on the sea coast kill turtle and dugong with harpoons. In former times these harpoons were made from wood sometimes with a wooden barb or barbs. The Nunguboiyu of the Rose river district, the Ingura of Groote Eylandt, and the people of Caledon and Blue Mud Bays, are all skilled canoe men and expert harpooners, and the influence of the sea, of fishing, and dugong and turtle hunting, on their life and economy is reflected in the number of drawings of canoes and of dugong and turtle hunts which they have left on the walls of rock shelters and such places.

In the course of these expeditions a considerable number of ethno-botanical specimens were collected, chiefly of food plants, fish poisons, and plants used for the manufacture of spears, paddles, and other weapons and implements, as well as for the production of fibres and resins. My thanks are due to the Director of the Royal Botanic Gardens, Kew and to Mr. C. T. White, Government Botanist of Queensland, for the determination of these specimens. Recently Mr. White spent two or three weeks in Melbourne working on the material and he has reported that it includes several plants not previously recorded for the Northern Territory and two which are new to science. One of them is a *Tephrosia* employed by the natives as a fish poison, the other a *Terminalia* the sticky resin and associated fibre of which are used for the caulking of leaks and cracks in canoes. Descriptions of the two new species will be published shortly.

# A NEW NET FOR A WORLD MAP

C. B. FAWCETT

THE AIM OF this net is to obtain a map showing all the important habitable lands of the earth, with a true representation of area and a minimum distortion of shape. The stimulus to the search was Figure 3 in Mackinder's "Britain and the British Seas," a map diagram which is of great value in enabling one to visualize some important facts in the relative positions of the major areas of land and of the oceans, but does not appear to be drawn on any exact projection. The same may be said of the "map" widely used on posters by the former Empire Marketing Board, which is an impressionistic sketch rather than a map. I have endeavoured many times in the past thirty years to devise an exact net on which such a map could be drawn. The solution given here occurred to me in August of 1948. I propose first to describe the construction of the new map-net for two cases; and then to note the chief features of the maps, and some of the uses to which they may be put.

On Map I, which shows the simplest case, the net is centred on the North Pole. For the hemisphere round the centre of construction, the northern hemisphere, the net is the normal azimuthal (or zenithal) equal area projection first contrived by J. H. Lambert, and described in many textbooks. Its bounding circle is, of course, the equator. The new feature is seen in each of the sectors which project from this hemisphere; for each an axis (a central meridian) is chosen in relation to the land areas to be shown. The meridians used are: for South America, 60° W.; for South Africa, 30° E.; for Australia and New Zealand, 135° E. The parallels in these sectors are arcs of circles concentric with those in the central (northern) hemisphere and are spaced at intervals from the equator equal to those of the corresponding parallels in that hemisphere. Along each parallel so obtained the meridians are spaced at distances from the axis equal to the corresponding distances in the central hemisphere. These distances are to be measured along the arc of the parallel in each case. Thus the mesh $a'b'c'd'$ in the South African sector is equal in area to the mesh *abcd* within the circle, between the same meridians and at the same distance from the equator (see Map I). These two meshes represent equal areas on the globe though they are not identical in shape. Every mesh in the sector is similarly related to its corresponding mesh within the circle. Hence the sector net retains the desired property of being equal-area. In each sector the meridians converge towards the South Pole and the central meridian crosses the equator as a straight line perpendicular to it. All the other meridians change direction on crossing the equator; they are not straight lines and do not cut the parallels at right angles. Therefore the map net in the sectors is not azimuthal. It is an arbitrary net on which the distortion of shape increases with distance from the axis.

The South Polar regions are shown by plotting round the position of the South Pole, at the end of each sector, an equal area azimuthal net for a radius of 30°. The enclosing circle is the parallel of 60° S. latitude and is

tangent to that parallel in each sector at the point where the parallel is intersected by the central meridian of the sector. These polar nets are exact reproductions of the net for the corresponding area round the North Pole. They show the position of Antarctica in relation to each of the southern continents, but for most purposes the three extensions are unnecessary.

The whole net so obtained may be called a composite map net; since the part in the great circle and the parts in the sectors are drawn on different principles. The relations between the parts are that they fit along the line of contact between them, which is part of the great circle enclosing the central hemisphere, and that they are drawn on the same areal scale. For the sectors only, the net might be spoken of as a discontinuous or interrupted map net; but it is not an interruption of a single projection like the well-known interrupted Sinusoidal or Mollweide maps. The only composite net in general use is J. P. Goode's homolosine which is used, chiefly in the United States, for both continuous and interrupted world maps.

Map II is an oblique case; for the centre of construction, and of the map, is not at either pole. In the polar case of an azimuthal net, the meridians and parallels themselves form the constructional net, which is therefore identical with the graticule of lines of latitude and longitude on the finished map. In an oblique net this identity no longer holds and the constructional net is entirely distinct from the graticule, which is the net of lines of latitude and longitude, on which are plotted the coast lines and any other geographical features shown on the map. Within the central hemispheres of these two maps the graticule of Map I is identical with the constructional net of Map II.

The constructional net for Map II was drawn as for Map I, but the centre is at London. Admiralty Chart No. 5085 is an accurate map, on the azimuthal equidistant projection centred on London, and the central hemisphere of Map II was made by a simple transformation from that chart. In the following account of the construction of Map II it is not necessary to repeat a description of the constructional net. The essential difference is that in Map I the constructional net is also the graticule, while in Map II the radii of the constructional net are great circles passing through the centre of construction and all the other circles of the constructional net are drawn round that centre. The radii correspond to the meridians, and the other circles to the parallels of latitude, of the polar case. The graticule is obtained by plotting on to the constructional net a sufficient number of points to enable one to draw on it the needed meridians and parallels. This was done at 5° intervals, except for a few areas requiring a finer mesh, where it was plotted to intervals of 1°. The axes of the projecting sectors of Map II are, of course, arcs of great circles through the centre of construction and radii of the central hemisphere. Only two such sectors are needed. Their axes were chosen so that the areas of minimum distortion of shape, those nearest to the axis in each sector, coincide as nearly as possible with the largest land areas in the sector.

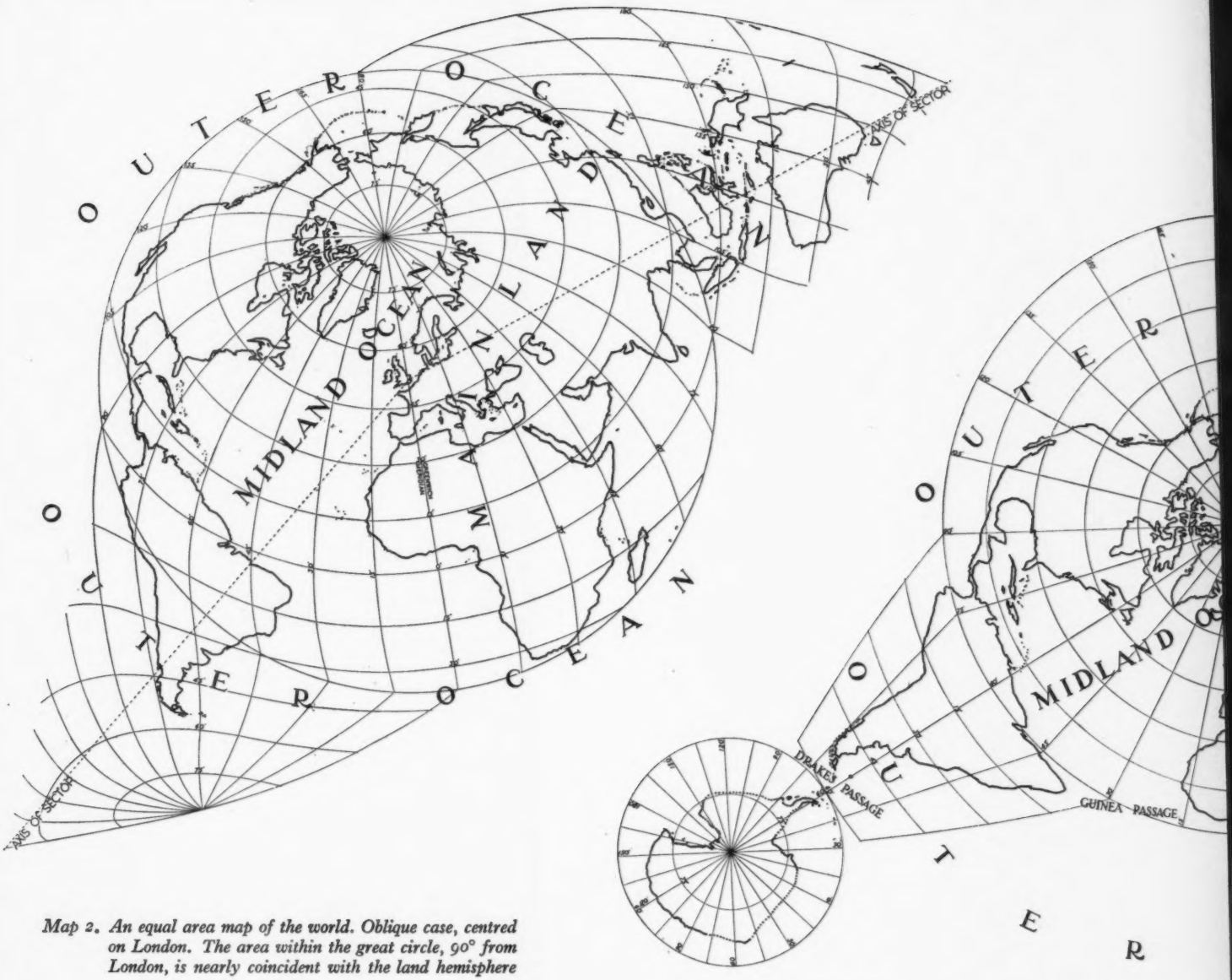
Some distortion of the shapes of land and water areas is unavoidable on any world map. It is the extent and distribution of this distortion that is important in an estimate of the value of a map for any practical use. In each of these maps the central area shows least distortion. The area within 45° of the centre of Map II includes all Europe, North Africa, the Middle East, and

the eastern part of North America. The corresponding area in the centre of Map I includes all lands north of 45° N. latitude in Eurasia and North America. Clearly the area within 45° to 50° of the centre on Map II includes a larger part of the more important lands than that within the same distance from the centre on Map I. For the areas on the azimuthal net, that is to say areas within the bounding circle of the central hemisphere on each map, the distortion is greatest near this circle. On Map I the east–west stretching, the compensating north–south compression and the resulting distortion of shape are all at their maximum in the northern half of South America and in Africa between about 15° N. and 15° S. The bounding circle of Map II does not pass through Africa, and it passes well to the south of the widest part of South America. Hence the shapes of these two continental areas are much better on Map II. South-east Asia and the East Indies are on or close to this bounding circle on each map, and so are similarly distorted on both.

In the outer sectors the distortion of shape is at its minimum near to the axis and increases rapidly with distance from that area. On Map II, South America is so situated that all its southern part is near to the axis of the sector, and the Australian sector is wider than the South American. Hence there is more distortion in the shape of Australia, but on balance it is clear that Map II shows the land areas with less distortion than does Map I.

For the ocean areas I would note first that these maps illustrate well the position and importance of what Mackinder called the Midland Ocean, and also the general world distribution of continents and oceans. The three largest land masses are Mainland, North America, and South America. These surround the Midland Ocean, and are in turn surrounded by what I have called the Outer Ocean. The two smallest continental areas, Australia and Antarctica, are islands in this Outer Ocean. Both maps illustrate these major facts of land and water distribution, except that Antarctica is not shown on Map II; but the Midland Ocean and its more important coastlands are better shown on Map II than on Map I because they are nearer to the centre of construction. On both maps the maximum distortion is in the areas of ocean which lie between the projecting sectors, and so are not shown. The Outer Ocean appears merely as a vast empty area surrounding all the lands. This is curiously akin to the medieval view of the ocean as that is shown, for example, on the Hereford *Mappa Mundi*.

For all purposes where considerations, and comparisons, of latitude are of primary importance the pole-centred map is to be preferred. For most other purposes for which a World Map of this type is appropriate the more useful one is likely to be one centred on or near the centre of the land hemisphere, in this case on London.

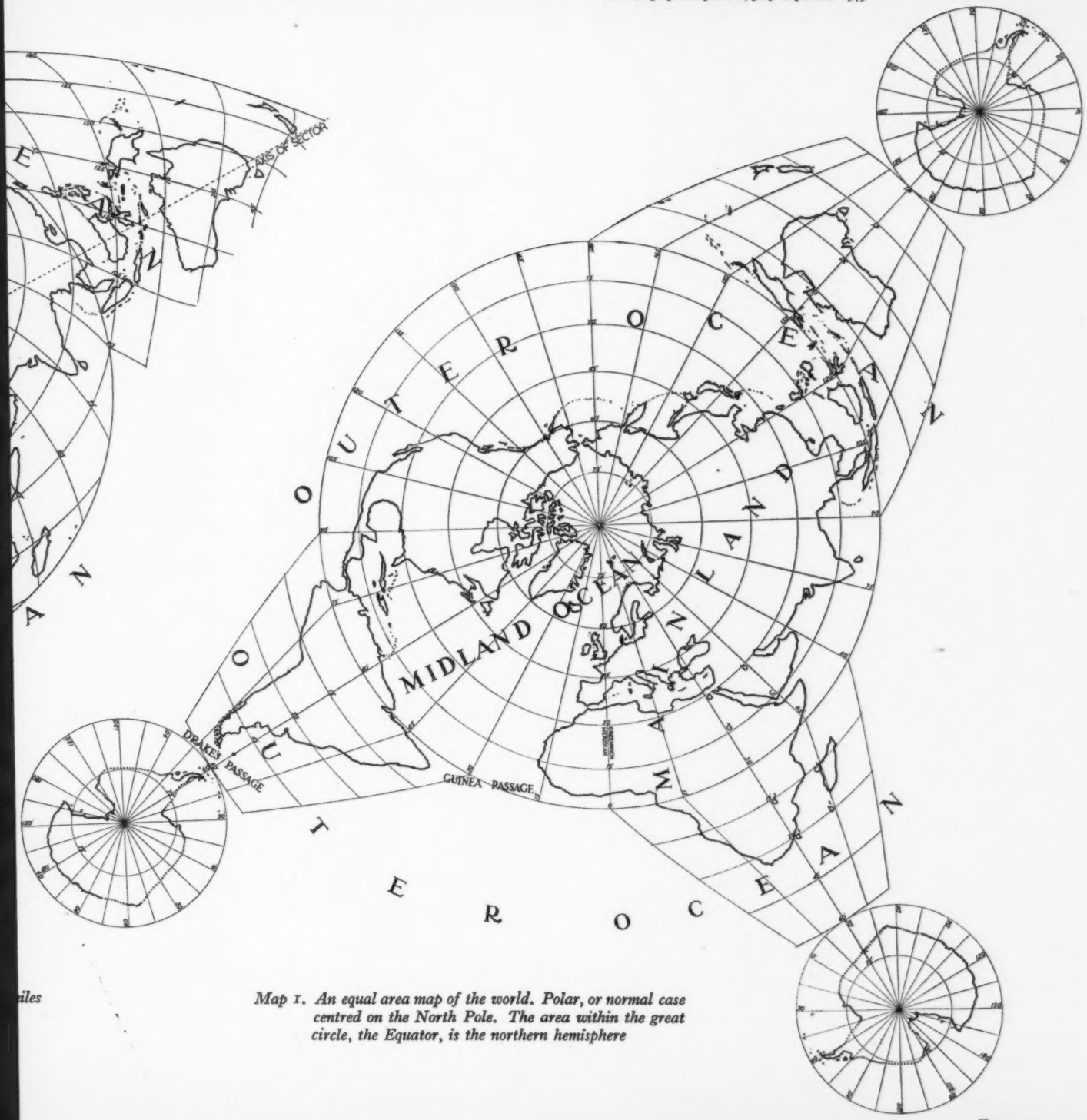



*Map 2. An equal area map of the world. Oblique case, centred on London. The area within the great circle, 90° from London, is nearly coincident with the land hemisphere*

*Area Scale ■ represents 100,000 square miles*

*Map 1. An equal area map of the world. Polar, centred on the North Pole. The area w circle, the Equator, is the northern hemi*

*Published by the Royal Geographical Society*




*Map 1. An equal area map of the world. Polar, or normal case centred on the North Pole. The area within the great circle, the Equator, is the northern hemisphere*

*Fawcett*

# GEOMORPHOLOGICAL FIELDWORK WITH THE AID OF ORDNANCE SURVEY MAPS

R. F. PEEL

THE GEOMORPHOLOGIST MUST necessarily depend for much of his factual information upon the published maps of official survey agencies. Such maps are not however designed expressly for his benefit, and even the best cannot provide more than a partial definition of the ground, or one more accurate than its scale will permit. This applies particularly to the portrayal of ground-relief, the aspect with which the geomorphologist is primarily concerned. Even in so well-mapped a country as Great Britain, it is only for the reconnaissance phases of landscape study, or for generalized analysis of wide areas, that such maps alone will suffice. For any more detailed or exact work, the data they afford must be supplemented by direct observation; measurement on the ground is normally essential, although to-day aerial photographs provide a partial substitute. This paper discusses briefly a few simple techniques that the writer has found useful for such fieldwork. As they are based on the fullest utilization of the data already provided on the official maps, some notes on the latter precede the description.

*The Ordnance Survey maps*

For work of the type indicated the 1-inch and smaller scales have little or no application. The new 1:25,000 map, the 6-inch and the 25-inch (1:2500) plans are the appropriate base-maps, according to the extent and detail of the work undertaken. The first is as yet only in provisional form, and the larger-scale maps are in process of revision and replacement; but since physical features (with a few exceptions) change but slowly, the lack of recent revision is little handicap to the physiographer. Apart from actual changes on the ground since their last revision, the large-scale maps can be taken as substantially accurate, to the limits of drawing, in the detail they show. Deficiencies, from the geomorphologist's viewpoint, relate rather to omissions than to inaccuracy. In plan, the only deficiencies likely to be encountered are the occasional omission or generalization of finer details, important to the physiographer but of no significance to the general public, such as those relating to minor and changeable drainage-systems. Omissions may however be of greater consequence in special types of country, such as coastal marshes where the pattern of shingle ridges and sand dunes is often considerably generalized. On the other hand, close examination of the maps will often astonish the user with the wealth of detail included. On the 25-inch plans for example, bare rock is depicted with remarkable fidelity, for specially trained men were employed on the original survey to "sketch the stratified rocks so as to give a correct idea of their strike and dip."

The deficiencies in the portrayal of relief are much more serious and the maps do not afford a record sufficiently complete for detailed morphological studies. They do however provide a framework of information which, by

reason of its great accuracy, can be used to create the fuller depiction necessary for such work by the use of quite simple methods. This framework consists of contours, Bench Marks, trigonometrical heights and spot heights (the ground level at selected points).

The 25-inch plans, which cover all the country save the higher mountain and moorland areas, show no contours for the original contour surveys were done at 6-inch scale. They contain however a profusion of Bench Marks and spot heights established by accurate levelling. These points, being confined to the lines of levelling which generally followed roads, are very frequent along such lines but naturally absent from the spaces between. At least one line of levels crosses each 25-inch sheet, but the linear disposition reduces the value of these points for direct contour interpolation. In using them, it should be remembered that Bench Marks are usually some eighteen inches above ground level, and that a spot height may no longer represent the true height of the ground if the surface has since been lowered or made up. Spot heights along undulating roads are often situated at the crests of rises and bottoms of depressions. On some old sheets still current the values do not correspond to the modern Newlyn Datum of the Ordnance Survey and where old and new sheets are used together puzzling discrepancies may arise.

The 6-inch map has a good selection of Bench Marks and spot heights and is contoured, though the contours are at rather wide and irregular intervals. Over most of the country only the instrumentally surveyed contours are shown and these are usually at 50, 100 and then each 100 to 1000 feet above sea-level and thereafter at intervals of 250 feet. In Lancashire and Yorkshire and in parts of Scotland, the map is contoured with a vertical interval of 25 feet but the intermediate contours are of a lower accuracy than the instrumental hundreds. The Provisional Edition of the 1:25,000 map shows fewer spot heights and Bench Marks than the 6-inch map from which it has been compiled and the values of the Bench Marks are given, not on the map, but in a separate list; the map is contoured at an interval of 25 feet but the contours that are not transferred from the 6-inch sheets are less accurate. The final edition is to have surveyed contours at this interval. The 1-inch map omits Bench Marks and the spot heights it contains have been rounded off; it includes some trigonometrical heights, an item not shown on the larger scales, but the value is that of a buried mark below the surface. The contours are at a uniform interval of 50 feet but, again, those not transferred from the 6-inch sheets are interpolated contours only. Such is the framework, in plan and elevation, that the official maps provide; the field worker must interpolate on them the finer detail, especially detail of relief, that is essential to his studies.

*The interpolation of detail in plan*

It is in the minute delineation of visible detail that the large-scale official maps excel and in most parts of the country very simple methods of interpolating additional information are quite adequate; as in all survey work, overelaboration beyond the needs of the situation is to be avoided. Wherever the mapped detail is sufficiently close the most appropriate method is that of "lining-in" employed by the Ordnance Survey itself for Revision and Examination. The method depends on using straight lines connecting points

of detail already mapped to establish the position of further detail and direct measurement is reduced to a minimum. Suppose that the observer places himself in a direct line with any two mapped objects; then his position will lie on the line drawn through the two corresponding objects on the map. If he is able to place himself simultaneously on two such lines, his position will be at their intersection. Short distances from this point, measured with a tape or merely paced, will enable him to plot the neighbouring detail with sufficient accuracy. Suitable objects for use with the 6-inch or 25-inch maps are field corners, gates and the corners of buildings; objects that are not readily visible from the point required can be "raised" by placing wands or pieces of paper in line with them on intervening hedges or walls.

If an extensive area of new detail is to be mapped, the plane table is perhaps still the best instrument, particularly if the ground is open. Graphical methods are by all counts the best, for much can be done by a man working alone and the new detail can be checked before the station is left. The maps will usually provide sufficient points of detail for resection, so that no new base need be measured, and the sheets themselves can be mounted on the plane table. This was the method used by the writer and others in mapping the sand-dunes and shingle-ridges along the coastal marshes of Norfolk. The work was drawn direct on the 6-inch quarter sheets, points such as church towers and the corners of buildings being used for resection and the detail picked up by pacing along rays. In areas lacking sufficient control detail, it may be necessary to do a skeleton plane-table triangulation first and on really difficult ground some linear measurement cannot always be avoided. This was the case when the writer had to map the convex surface of the peat-bog at Malham Tarn. More elaborate survey methods will seldom be required save on open moorland where firm detail is almost lacking on the maps. In such circumstances, compass traverses or a tacheometric survey with a light theodolite may become necessary. The air photographs referred to at the end of this paper are invaluable for the identification of detail in featureless moorlands.

*The interpolation of heights*

The wide contour interval of the official maps must make necessary the interpolation of heights in almost any kind of geomorphological fieldwork and the requirements of the particular problem may call for anything from the simple determination of a few key points to the construction of detailed surface profiles or overall close contouring. The relative flatness of stream profiles and the significance of small changes of gradient necessitate measurements of a rather high accuracy and neither aneroid readings nor clinometer angles from Bench Marks are usually of much use. For reliable results there is no alternative to instrumental levelling, laborious as it is and requiring the continuous service of an assistant. It is however often unnecessary to make measurements of distance as the positions of the levelled points can be interpolated in the manner already described or merely by visual inspection. When measurement is necessary, a level with stadia wires in the eye-piece can be used with advantage, azimuths being read on the graduated horizontal circle. If there is a line of levels along a road parallel to the stream, it is

sometimes quicker and simpler to carry down separate levels to successive river points than to level continuously along the stream itself. For such short distance work a small hand level or Abney level (at its zero reading) set on a four or five-foot staff and used with a graduated pole is quick and convenient and will give results correct within a foot. The most suitable profile to record is the actual water surface of the stream, for the edge of the bank often has many irregularities and the stream bed is seldom accessible. Allowance must of course be made for marked fluctuations in the flow during the work. Bench Marks should be included in the line of levels every few miles so that accumulated errors can be checked and distributed. On the Tyne and its tributaries the writer allowed intervals of from 100 to 400 yards between the successive levelled points of the profile, with a much shorter interval at weirs, waterfalls, possible "rejuvenation-heads" and in the steeper reaches. Using a small Watts level, two workers averaged four or five miles of continuous profile in a day. To maintain interest it is advisable for the leveller and staff-holder to exchange duties from time to time.

An adequate record of the form of a river valley can generally be secured by making frequent cross valley profiles in conjunction with the stream profile, without the labour of contouring the whole area at a close interval. Instrumental levelling for the cross profiles is not so necessary, especially if the slopes are steep, as long as the breaks of slope and other valley-side features can be located on the map and levelled at once from a nearby Bench Mark or contour. A hand level or Abney level is often sufficient for the purpose; it involves little extra work to include such points, if they are near the stream, in the levelling of the longitudinal profile. The hand level or Abney level can be used to bridge fairly wide vertical intervals by finding a point ahead at the level of the eye and distinguished by some characteristic stone or tuft of grass; moving forward to this point one repeats the process, so that the vertical interval between successive stations is the height of the observer's eye or the length of the staff on which the hand level is mounted. This simple method, which requires no assistant, is tolerably reliable over short distances on steep slopes. On regular slopes, it may be sufficient to measure their inclination between salient points with some form of clinometer, or the inclination may be measured in a side view, holding an Abney level before one's eye, its sighting tube parallel with the slope. Similarly, estimates of the slope may be made from photographs or field sketches. Sketches and panoramas are in any event of considerable value to the field worker and those who find sketching difficult may use a transparent frame ruled in squares and make their drawings on squared paper.

Complete contouring of the area studied at a close interval is often necessary, but for 10-foot contours on the 6-inch map a simple procedure is often adequate if the ground is fairly steep. All the additional information of spot heights and Bench Marks from the 25-inch plan and the 1-inch map should first be transferred to the sheet in use. Taking up a position near one of the spot heights so that the axis of a hand level or light telescopic level is at the true height of one of the contours, the instrument is turned left and right along the slope so that the run of the contour can be followed. If actual points on it can be interpolated sufficiently well from the surrounding detail of the map, a quarter or half a mile of the contour may be plotted at a single setting. The

observer then moves up or downhill to the level of the next contour and repeats the process. More elaborate methods of contouring, with the plane table or with a small levelling instrument, will be necessary if their is insufficient mapped detail for this simple expedient.

*Air photographs*

Most of Great Britain is now covered with vertical photographs at about 1 : 10,000 scale, prints being obtainable from the Air Ministry, while considerable areas are covered by Ordnance Survey photographic mosaics at the 6-inch scale. The latter afford valuable adjuncts to the normal maps for the inspection of fine detail, and despite the slight distortions inherent in the mosaics, additional detail can be copied from them on to the maps by simple methods with quite fair accuracy provided there is sufficient firm detail common to mosaic and map to provide a reference framework. The individual photographs are however more valuable, since the stereoscopic examination of suitable pairs allows details to be more surely identified; while the whole relief of the ground can be scrutinized in detail. Approximate contouring of suitably dissected ground with the aid of such stereoscopic photography is very simple, requiring no special skill and only a good hand stereoscope. Firm detail such as field boundaries common to map and photographs affords a reference framework from which the existing map contours and spot heights can be transferred to one photograph of the pair. Additional contours can then readily be traced direct on to the photograph through the stereoscopic image; the contouring is then copied back on to the map. Embellishment of the map relief by hachuring or shading becomes much easier and more certain with the aid of such photographs; with a little more elaboration, reasonably precise contouring can be undertaken. This however demands methods and corrections beyond the scope of this paper.

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# INTERNATIONAL GEOGRAPHICAL CONGRESS, LISBON, 1949

THE SIXTEENTH INTERNATIONAL GEOGRAPHICAL CONGRESS met, at the invitation of the Portuguese National Committee for Geography and with the support of the Portuguese Government, at Lisbon in April this year. It has already been briefly noticed in the *Journal*, and was perhaps of more than usual interest and importance. It renewed the continuity of the series which had been interrupted for eleven years by the war, and it set before geographers of many lands their common task of seeking to understand and make known the pattern of the world—of the human habitat—that now touches so nearly man's efforts to employ his discoveries in science and technology and his attempts to shape his destiny. This theme is reflected in four of the seven new commissions set up at the conclusion of the congress; the new Commission on the 1/M. world map as a base for the representation of a wide variety of geographical distributions, in particular the distribution of population; and the new Commissions on World Land Use, Regional Planning, and Soil Erosion.

The organization of this congress in the face of post-war difficulties can have been no light task, as is evident from its postponement last year at a point when preparations were well advanced for holding it in September. April is perhaps a less convenient month for academic geographers, but Portugal was delightful in the spring, and the labours of the Organizing Committee were crowned with success.

Though many *congressistes* had arrived earlier to take part in Excursion D the formal opening of the congress was on April 8 when the President (Professor Emm. de Martonne), Professor G. B. Cressey and Professor Boerman addressed the congress in the presence of the President of the Republic and the Cardinal Patriarch at the Palácio da Assembléia Nacional.

All the Sections were conveniently accommodated in the Instituto Superior Tecnico in the northern suburbs with its cool and lofty central hall and numerous lecture theatres; there also the hard-worked secretariat distributed literature, enrolled the members of excursions and answered innumerable inquiries. It was not to be expected that the elaborate plan of publishing all papers *in extenso* before the meeting, which was followed at Amsterdam in 1938, should be adopted this year, but résumés had been collected into a handy volume which was available at the opening of the congress. The only criticism of the arrangements was that it was not always possible to know in advance what papers a Section would discuss on a given day or where it would meet, which led to members confining their attendance to a particular Section or to a few Sections and missing some of the papers they would have wished to hear.

## *Notes on Sections*

### *Section I (Cartography)*

There were five questions on the programme for the Section.

The first question was the representation of relief from the topographical

and morphological points of view. Contours form the basis of all systems of relief, but they are not always sufficient to give a good impression of relief. Even on the medium scales it is often necessary to add a hill shading to enhance the impression; at small scales it is always necessary to add layer colouring, hill shading, or hachures. The Swiss get a very good effect by the use of contours, hill shading and special rock drawing on their 1/50,000 and 1/100,000 scale maps. Generalization is done by the topographer when his survey is used directly for a small scale map. He has the ground in front of him which makes it easier. In the case of small scale maps derived from larger scales the cartographer has to generalize, with only a larger scale map in front of him. A knowledge of morphology is most desirable since he has to analyse the country to ensure that he maintains its character. The problem varies enormously with the country and the scale.

The second question was the cartography of flat and very wooded areas (French Guiana was taken as an example).

Vertical and oblique air photographs have recently come into use but much detail is hidden by the woods, and contours can only be approximate. The French are making a 1/100,000 map; a few astro points are used as base for a photo-triangulation; a small number of heights are fixed by barometer. The difficulty with vertical photographs is to get regular overlaps in such country. Oblique photography, such as Trimetrogon, saves flying time and ground control and simplifies navigation, but interpretation of detail becomes very difficult. Vertical photography is therefore the best. The navigational problem could probably be solved by the use of radar.

The third question was the inclusion in all maps of an indication of their source material and their reliability. The methods used in making the map and the resultant accuracy can be briefly indicated by the use of a system of classification such as that used by the French. (1) Precise surveys. (2) Regular surveys: (a) plane table, (b) photogrammetric. (3) Simplified surveys: (a) Rapid: (i) plane table, (ii) photogrammetric, (b) Reconnaissance. (c) Exploration.

A resolution was passed supporting the proposition that the International Geographical Union should encourage the development of an international terminology which would enable the source and reliability to be given briefly on maps in terms intelligible to all.

The fourth question was the desirability of standardizing conventional signs. The choice of conventional signs, especially at large and medium scales, is mainly determined by the nature and character of the country and a slow evolution in the direction of standardization, mainly at scales such as 1/500,000 or smaller, is all that can be definitely envisaged.

A resolution was passed supporting the proposition that the International Geographical Union should keep in close touch with U.N.O. with a view to encouraging standardization of conventional signs whenever practicable.

Finally there was the general question of new cartographic work and fourteen countries presented reports on recent cartographic activities.

No less than five of the countries are preparing or have prepared a national atlas.

In flat countries such as Denmark the normal hypsometric map is of

little value for a geographical study of the essential characteristics of the country.

The Ordnance Survey of Great Britain reported what they are now doing to eliminate the errors that accumulate at each revision unless proper precautions are taken. First, the errors due to paper distortion and drawing inaccuracies are largely eliminated by working on metal in place of paper. Secondly, the difficulties due to obliteration of topographical features by developments are overcome by coordinating a very large number of "revision points" by traversing.

There was considerable interest in the subject of population maps. A resolution was passed supporting the proposition that a population map of the world be established at a scale of 1/M. The Commission on Population will, it is hoped, follow up this resolution.

Monsieur Gaussen (France) produced some most interesting maps of the "Tapis Vegetal" of France and suggested that a system such as he had used could well be extended to cover the world, using the International 1/M. as base map.

A resolution was passed supporting the proposition that the International 1/M. be reviewed, in conjunction with other mapping at this scale, with special reference to the need for a 1/M. base map for a variety of geographical overprints such as population, "tapis vegetal", etc. Subsequently, at the General Assembly, a new commission was formed to make this review.

D. I. B.

*Section II* (*Physical Geography*) *and Section III* (*Biogeography*)

The chief interest in the Physical Section centred on the subject of "pediments" in arid and semi-arid climates, but "granite relief" and the "régime of Mediterranean rivers" attracted a fair amount of attention.

The Biogeographical Section was not well supported, and few of the papers were of great geographical interest. Mention should however be made of H. Gaussen's paper in Section I on the 1/M. map of the "tapis vegetal" of France, and his proposal that a vegetation map of the world should be compiled on this scale.

The "Commission pour la Cartographie des Surfaces d'Applanissement" produced a report (148 pp.), of which 114 pages were devoted to an interesting account of erosion surfaces in Portugal, and the remainder to Morvan, Grande Limagne, Bretagne meridionale and Afrique Noire Française.

For the next Congress the Physical Section has put down the following questions for discussion:

(1) The precise nature and the speed of operation of processes of weathering erosion.
(2) Climatic factors of importance in the study of biology and biogeography.
(3) Glacial relief and periglacial morphology.

A. A. M.

*Section IV* (*Human and economic geography*)

The Section was, as usual, well attended and attracted a considerable number of communications, including many additions to the literature on types of rural settlement and on seasonal migrations, subjects whose study

previous congresses have done so much to foster. Of particular interest was a paper by Professor Humlum on traditional systems of irrigation in Afghanistan, based on last year's field work of the Danish Central Asian Expedition. The discussion on S. Van Valkenburg's proposal for a world-wide survey of land use has already borne fruit in the establishment of a new commission to undertake the project. Communications by members of the British delegation were not numerous, but included a paper by K. C. Edwards on the transformation of our rural East Midlands with the rapid growth of coal and iron workings; a paper by F. H. W. Green on the assessment of zones of influence of country towns by an analysis of local motor-bus services; and a paper by Dr. Geddes on the hamlet as a unit of labour in Celtic lands, the home of a boat's crew or of farmers dependent on mutual assistance.

*Section V* (*The Geography of Colonization*)

The Section divided its work into three parts. The first aspect considered was agriculture in the tropical zone, papers being read by research workers (some connected with the *Institut Français d'Afrique Noire*) upon agriculture in Mauritania, French Guinea, northern Togoland, mid-Dahomey, São Tomé and Brazil. The second division of its work concerned the movements of indigenous peoples, and papers were given on those in Colombian Amazonia, eastern Morocco and Ashanti (R. W. Steel of Oxford). The third part consisted of the general examination of colonial transport problems and of particular studies of Eritrea and of French and British West Africa (R. J. Harrison Church of the London School of Economics).

The Section was attended mostly by French and Brazilian geographers and surprise and sorrow were expressed that so little interest was taken in the Section by most people of other delegations. It was agreed that it was probably desirable in future congresses to organize the Section as a part of Human Geography. R. J. H. C.

*Section VI* (*Historical Geography and the History of Geography*)

The Section, over which Professor Roberto Almagià presided, with Professor Angela Codazzi as secretary, was, it must be admitted, disappointing. Many papers, of which a résumé had been published, were unread and therefore not open to discussion; those read, some of which were excellent, did not suffice to fill an unambitious time-table; and the sessions were but thinly attended. The results of this Section were in noticeable contrast to the vitality which it showed at previous Congresses.

Its relative failure may be conjecturally traced to two or three causes. It was no doubt weakened by the absence of German scholars (some dead, others unable to attend), who have in the past been conspicuous in this field. Secondly, the programme of the Section and the papers presented to it were mainly concerned with the documentary sources (textual and cartographical) which furnish an essential part, but only a part, of the evidence used by the historical geographer. Historical geography, in its wider sense, was almost ignored.

Three themes were proposed for discussion:

(*a*) The distribution of population according to prehistoric documents [*sic*].

(*b*) The transformation and evolution of geographical ideas under the influence of the Great Discoveries of the fifteenth and sixteenth centuries.

(*c*) The utilization, in the study of Human Geography, of the descriptions of voyages of the sixteenth to eighteenth centuries. It is no doubt difficult to lay down a programme at once wide enough to embrace the fields worked by different scholars, and sufficiently well-defined to lend a unity of purpose to the proceedings of the Section. Yet this programme plainly suffered from lack of definition, and it laid too much emphasis on the history of geography to the neglect of historical geography.

In spite of these reservations, certain admirable papers are gratefully recalled. Professor Almagià discussed the representation of the Indian Ocean in the maps of Henricus Martellus Germanus. Professor Codazzi spoke on the unique MS. of the 'Cosmografia dell'Africa' of Leo Africanus lately discovered and now being edited by her; Leo's work was hitherto known only in the manipulated version published by Ramusio in 1550. An interesting paper by Dr. Helena Martin-Delfour described the conventions and interpretation of the sea-charts constructed by the natives of Micronesia.

Associated with the work of this Section is that of the Commission for the Bibliography of Ancient Maps, which narrowly escaped extinction on account of infertility. It has now been reconstituted under the presidency of Professor Almagià and with the useful task of preparing definitive bibliographies of early maps, both MS. and printed. As a first stage in its work the Commission has undertaken a world list of MS. maps to the year 1500, which will be laid before the Congress of 1952. In the preparation of this bibliography, which will be extended by stages to 1600 and probably later, the collaboration of scholars in many countries will be essential and, it is hoped, forthcoming. R. A. S.

*Section VII* (*Methodology and Didactic*)

In the absence of the President, Professor Cholley (France), the Section met under the joint chairmanship of the two Vice-presidents, Professor Leite de Castro (Brazil), and Professor Burky (Switzerland).

Attendances were largest and discussions most vigorous in sessions devoted to papers dealing with theory and practice in the delimitation of geographical regions, conspicuous amongst these being contributions by Dr. Goblet (France), Drs. O. Ribeiro and F. de Macedo Guimarães (Portugal). An interesting map technique for the finer definition of geographic regions was demonstrated by Professor Granö (Helsinki) and examples of regional classification were presented by F. Falcão Machado (Portugal) and H. Onde (Switzerland).

There were a few papers dealing specificially with some aspects of school geography in Belgium, Canada and Brazil; and others on such varied topics as the content of Geography (Professor Burky) and geographical terminology (Dr. Kant, Sweden). Geographers in this country may be interested to learn of a glossary of geographical terms that is being prepared in Sweden by the department of geography in the University of Lund, and which is designed to embrace the terminology of the geographical sciences in ten European languages—mainly to meet the needs of Fennoscandinavian countries. This

project was discussed and specimens of the card index entries were submitted to the Section. In subsequent discussions the desirability of extending this work to include the terminology of other fields in the subject and the need to submit the translations of terms to experts in each of the countries whose language is concerned in the scheme, was generally approved.

While only twenty papers were read, out of the thirty-one submitted, and attendances were in general comparatively small, the work of the Section had a thoroughly "international" character and was supported by members representing many countries and a diversity of points of view and of interest. In some cases, in fact, the subjects presented might more appropriately have been included in the work of other Sections—as for instance the papers on Fluvial equilibrium and methods in Geomorphology. Geographers from this country took little part in the work of the Section as a whole, and in the only British paper contributed a general survey was made of Geography in relation to post-war trends in education in Great Britain, from which, in discussion, it seemed evident that few of the foreign members present had any knowledge of the changes and developments in educational systems, and of the rapid improvements in the status of geography that have taken place in recent decades in this country. A. G.

It was most unfortunate that this country, apparently through a misunderstanding about the arrangements for their display, remained almost unrepresented in the exhibition of modern maps, which also was set out in the Instituto Superior Tecnico. The United States exhibit was, beyond doubt, the most complete and impressive, and Canada made a good show among the many other countries which participated in the exhibition. Our lapse was a little redeemed by a display of the map series of the Ministry of Town and Country Planning in Section I, which met with general approval there; but the work of our colonial surveys, recently on view in the Society's Ambulatory, would in itself have been an appropriate item at an international congress.

At one of the afternoon sessions the American delegation showed a fine colour film of "Operation High Jump", the United States Navy expedition to the Antarctic in 1946.

A General Assembly of the International Geographical Union was held on April 15, the last day of the congress. Certain minor amendments to the Statutes of the Union were approved and the unit of contribution for the ensuing period was fixed at $100.

The following new Commissions were set up:

(i) On the utilization of air photographs (Chairman, M. Barrère)

(ii) The 1/M. World Map as a basis for geographical distributions (J. K. Wright)

(iii) Medical geography (J. M. May)

(iv) World land use (S. Van Valkenburg)

(v) Regional planning (J. Gottmann)

(vi) Periglacial morphology (H. W:son Ahlmann)

(vii) Soil erosion (E. Ackerman).

The following existing Commissions were continued:

(i) The study of population (Chairman, C. B. Fawcett)
(ii) Industrial ports (W. E. Boerman)
(iii) Agrarian geography (D. Faucher)
(iv) Ancient maps (R. Almagià)
(v) Pliocene and pleistocene terraces (H. Baulig)
(vi) Tertiary erosion surfaces (J. Gottmann).

Two of the former Commissions, on the study of climatic variation and on air survey, were dissolved, it being felt that the number of commissions in being should not become unduly large and that the subjects they dealt with had now developed beyond the stage in which their special promotion was necessary.

Invitations for the next Congress in 1952 had been received from Austria, Brazil and the United States of America. It was regretted that Austria was not a member of the Union and the American invitation was warmly accepted after the Brazilian delegate had expressed his hope that, the United States being perhaps the more convenient *venue* for the next meeting, the claims of Brazil should be considered for the next meeting after that.

China, India, Hungary and Turkey were admitted as new members of the Union.

On his retirement from the presidency of the Union Professor Emm. de Martonne was made Honorary President for life, and the following officers were elected for the ensuing period:

President: Professor G. B. Cressey (United States). Vice-Presidents: Professor R. Almagià (Italy); Professor M. A. Lefèvre (Belgium); Professor O. Ribeiro (Portugal); Professor Leite de Castro (Brazil); Professor Dudley Stamp (Great Britain); Professor Hans Boesch (Switzerland); Professor G. H. Kuriyan (India). Secretary: Professor G. H. Kimble (Canada).

The Congress closed with a ceremony at the Geographical Society of Lisbon at which addresses were delivered by Professor de Martonne and Professor Cressey, the new President expressing the hope that closer and more frequent contacts might be maintained between the Union and the National Committees than had been possible in the troubled years now past.

The Congress was hospitably entertained. There were receptions by His Excellency the Minister of Education and by the President of the Municipal Council, the latter in Lisbon's unique and charming "cold greenhouse" of tropical plants, the *Estufa Fria*. There was a gala performance at the theatre of São Carlos. The heads of delegations were entertained to a dinner by the President of the Institut pour la Haute Culture. Our own delegation also enjoyed the hospitality of the British Embassy and the British Council. A series of visits to museums and art galleries had been arranged for the ladies.

In addition to day excursions to Cintra and Arrabida, a cruise on the Tagus and a tour of Lisbon; six major excursions had been arranged.

The concise and authoritative guide books for the longer excursions, copies of which are in the Society's Library, will be of permanent value to students of the region, and the promised volume of essays on the Geography of Portugal will come as a pleasant reminder of their visit to all who attended the congress.

# REVIEWS

## EUROPE

THE GEOGRAPHIC BACKGROUND OF GREEK AND ROMAN History. By M. CARY. *Oxford: The Clarendon Press*, 1949. 9½×6½ *inches;* vi+331 *pages; maps.* 30*s*

The twentieth century is no longer new: nor is modern Geography. Those historians and economists who loudly denied that geography (seen only in its most obvious aspects) was relevant to history and economics have hushed their voices, confounded perhaps by the lesson of events during the last ten years. Hence it is to-day no matter of surprise that a Professor of History should write, and the Clarendon Press publish in most attractive form, a work of 331 pages on the geographical background of Greek and Roman history: no matter of surprise, moreover, that he should illustrate it with excellent maps showing real geographical insight. But the geographical reviewer must confess to an initial astonishment upon reading in Professor Cary's Preface an acknowledgment of his indebtedness to Miss Ellen Churchill Semple. For Miss Semple was a disciple of Ratzel who went even beyond her master in affirming the far-reaching influence upon human affairs of the geographical environment; she was, in fact, the prophet of geographical determinism. Geographers themselves, if they were wise, impressed upon their students the necessity of reading her excellent and stimulating works with great caution, while historians treated them as so much nonsense. The scene has indeed changed, reset perhaps by such writers as Professor Arnold Toynbee.

Professor Cary is, of course, himself no stranger to geography. His 'Ancient Explorers,' written in collaboration with Professor Warmington is the standard work on that subject. In the book under review the opening chapter is devoted to a concise description of the Mediterranean environment as a whole, and is enriched by lively footnote references to its impact upon the imagery and concepts of Homer, Virgil, Aristotle, Pliny and the rest which whet the reader's appetite for what is to follow. And let the geomorphologist refrain from sarcasm when he reads in passing of the Mediterranean geo-syncline as "scooped out," for such faulty turns of expression are inevitable when the specialist steps into a field not his own and the practice of making capital out of them acts as a major deterrent to that coordination of related aspects of knowledge which we so urgently need. The succeeding chapters are planned on regional lines, the various parts of the ancient world, Greece, Italy, the Near East, the Middle East, North Africa, Western Europe and so on being discussed in turn. The author's plan is to penetrate to the limit of direct Greek or Roman influence, so that India, Britain and Scythia all lie within his ambit. One reader at least regrets that he did not devote a final chapter to a review of the whole picture and an estimate of the actual weight of the geographic factor in the unique histories of Greece and Rome.

A wealth of classical scholarship was, of course, only to be expected from Professor Cary, but we may well be astonished at the minuteness of his knowledge of significant topographic and economic detail. This emerges whether we are reading about the siting of the Greek City States, Trajan's frontier problems in Dacia, the rise of industry in Campania, or on a very much smaller scale, the reason why the wheat-goddess Demeter received special homage in Attica. There are occasions when we feel competent to argue with the author,

as for example when he accounts for the alleged slow-wittedness of the Boeotians by the exhalations from Lake Copais, but we listen with respect to his story of geographical transformations effected by Roman engineers in North Africa, or improving land-lords in Spain, and we find very acceptable his verdict that Alexander in fact suffered defeat at the hands of the Indian monsoon.

Copious and exact references are given in the footnotes, often to material and sources which will be new to the geographer, and these references, together with the carefully classified Bibliography, make the book most valuable to the student. But they are so arranged as not to distract the general reader who, even if he is only modestly well-read and modestly well-travelled, will find here a most fascinating story. The ease and freshness with which Professor Cary handles a complex mass of material can be illustrated by quotations taken almost at random. Three must suffice. "On the Eastern margin [of Persia] the sunken basin of Seistan . . . to which the river Helmund and its tributaries convey the off-flow from the highlands of Afghanistan might be compared with Egypt, but for the lack of systematic water-regulation. It was in such favoured tracts that the Persian grandees laid out their parks with game preserves and orchards . . . or raised crops of alfalfa as fodder for their big-boned chargers; and that the subsequent Greek settlers planted their vineyards" (p. 191). "The sea of Marmora is as it were a natural creel for trapping the shoals of fish that migrate annually from the Mediterranean towards the Black Sea; the tunny, which was the standing coin-type of Cyzicus, was also one of its chief sources of wealth" (p. 158). Or again, "The North Sea is less boisterous than the Channel and Bay of Biscay, but it is not immune from summer gales, and at all seasons it is liable to be hemmed in with thick cloud or blurred with mist. Its Frisian and Jutish coasts are ill-defined and partially submerged at high tide; and such conditions of low visibility and vanishing land-marks were peculiarly baffling to seamen trained in Mediterranean waters" (p. 274). E. G. R. T.

GEOLOGY AND SCENERY IN ENGLAND AND WALES. By A. E. TRUEMAN. *London: Penguin Books*, 1949. 7×4¼ *inches;* 352 *pages; illustrations and sketch-maps.* 2*s* 6*d*

On its publication in 1938 Professor Trueman's 'The scenery of England and Wales' received a warm and well-deserved welcome. The book struck a happy mean between detailed physiographical writings and less scientific "guides" and "companions." It proved an education to the layman and a pleasant reminder to the professional. It rapidly went out of print and remained unobtainable until now republished as a Pelican Book under the new title. Not only is the complete text retained but all the original 95 figures, which depict so artistically and clearly the relation of structure and scenery, are reproduced. There is however one notable alteration. The cost of the volume has been reduced from 7*s* 6*d* to 2*s* 6*d*, at which price it is even more unrivalled in its field. All who take an interest in our countryside will find the book invaluable, and author and publisher alike are to be congratulated on providing so cheaply so excellent "a basis for a wider appreciation of the scenic features" of England and Wales. R. P. B.

SWISS LIFE AND LANDSCAPE. By EMIL EGLI. *London: Paul Elek*, 1949. 8½×5½ *inches;* 161 *pages; illustrations.* 12*s* 6*d*

This book is a translation from the German and is a welcome addition to the scanty literature in English on modern Switzerland. It is neither a textbook nor a traveller's guide. Of its two parts, the first "The Picture" is concerned with environmental studies of such regions as the Valais, the Mittelland and the

Engadine; the second "The Personality" describes selected aspects of Swiss life associated with the *föhn*, avalanches, seasonal nomadism and, finally, the political harmony presented by the republic in spite of its four official languages. The photographs are of great artistic merit and technical excellence and illustrate, for example, storm clouds impinging on the south face of the Matterhorn while the sun sparkles on the Gorner glacier; wind-slab, wet-snow and snow-dust avalanches; and high altitude villages in the Val d'Anniviers. There are of course errors, for at Pinsec "the châlets . . . perched on a ridge like sparrows on a telegraph wire" are *mazots* or hay barns, and "Winter scene near Arosa" cannot be in the Engadine. Other mistakes occur through faulty translation; "the *chalk-striped* walls of the Salève" (p. 41 and similarly on p. 48), "Mediterranean Carrigue" for *garrigue* (p. 36) and "Aleppa" (p. 40). The author is clearly out of his depth when writing on Alpine geology and also when he attempts fantastic comparisons between the dry climate of Sierre in the Valais and the "steppe" climate of the Sudan (p. 35). Snowfall figures are sometimes quoted as precipitation, so that the figure for the Säntis is given as 741 inches, compared with the reduced figure of 96 inches quoted by Früh as the Swiss maximum. Nevertheless this is an unusual and stimulating little book, full of pleasing imagery, attractively written and illustrated and a useful introduction to fuller studies of this Alpine land, with its endless variety and complexity of physical forms and cultural life. A. F. A. M.

SLAVONIC ENCYCLOPAEDIA. Edited by JOSEPH S. ROUCEK. *New York: The Philosophical Library*, 1949. $9\frac{1}{2} \times 6$ *inches;* xi+1445 *pages.*

The Slavonic Encyclopaedia suggests an enormous expenditure of time and energy without very satisfactory results. There is a huge store of factual detail collected in this volume, but the arrangement appears amateurish, and only the diligent seeker for information about the Slav lands and peoples is likely to rummage about in it to refresh his memory or to hunt for new scraps. The main annoyance is the attempt to combine gazeteer information with something like *Who's Who* and a kind of *Whitaker*; there is nothing more than the alphabet to act as a framework, so that the final impression is of a colossal and haphazard list of people, places and topics. There are some instances of startling inconsequence. Why should the heading "Geology and Topography" (p. 378) be followed by a description of the racial traits of the Slav peoples? The reference to Cetinje, again, is an instance of the inadequate character of this attempt to develop Slav studies. And finally, the English is painful. It is true that for many contributors to this Encyclopaedia, English is a foreign tongue; it is true also that snippets of information about this and that do not lend themselves easily to literary excellence. But paragraphs can be written without resort to a telegraphic style. The single sentence describing the life and death of the Quisling, Nedič, is a case in point. H. G. S.

## ASIA

THE REVOLT OF ASIA. By ROBERT PAYNE. *London: Victor Gollancz*, 1948. $8 \times 5$ *inches;* 345 *pages.* 12*s* 6*d*

This book might have been as important as the author evidently thinks, and as the publishers claim, could Mr. Payne think with his head as well as with his heart. He brings into a coherent narrative of confused events much little-known information, much insight into specific situations, a vigour at times almost apocalyptic, some brilliant descriptive writing (for example, on Indonesian and Yenan landscapes) and flashes of really penetrating epigram. Indonesians are

"adept at intrigue, like all those who live so much of their lives within the family"; India is "two states of mind held in precarious balance, a vast land mass given over to schizophrenia" (no bad image of the world at large!). All these things provide much stimulus to thought, but at crucial points the author allows his argument to rest on analogy and rhetoric, and not least of the lessons of the book is its negative illustration of the virtue of sobriety.

The scope is vast, the theme set out in the first and elaborated in the last two chapters arresting; Asia is one, its current revolutions the pangs of one gigantic birth. It is true that he writes only of Monsoon Asia, and surprisingly omits Ceylon and Thailand; nevertheless the ground is more than enough for one book to cover. Hence, naturally, there are inequalities. If on Korea, so generally neglected, he gives us good detail in an almost unbearably gloomy picture, in Indonesia we have eloquent voices speaking from a confused, almost chaotic, screen. But in this section we have perhaps the best thing in the book; long extracts from the writings of Sjahrir who is clearly a political thinker of a high order, with an incisive clarity which one reads with the thrill of a new thing. The chapters on China contain an interesting account of China's 'Third Force,' which suffers from the usual occupational disabilities of those who, with the best motives, will sit on the barricades. Here the author is on his own ground and, although some over-simplification may be suspected, it would be presumptuous of the reviewer to offer serious criticism. His attack on the Kuomintang rings true enough, though a little vitiated by the fact that the phrase "elected by the people" is sheer verbal magic to Mr. Payne.

The excellencies of the book are thus not few; unfortunately the shortcomings are not few either. There are some ambiguities and errors which suggest hasty writing; slips mostly, but when Bangkok is placed in Burma (p. 277) it is slipping rather far. Writing apparently in mid-1947, the author displays an astounding lack of caution: the early reference (p. 15) to Burma and Indonesia as having "succeeded in their revolution so quietly" rings strangely as well as sadly, and his own summing-up of Burmese affairs should have warned him. This naïvety involves him in a gross underestimate of the validity of the Pakistan idea, and an equally gross exaggeration of its Pan-Islamic significance. It is debatable even in theory whether "Geographically and historically, partition is meaningless" (p. 101); unfortunately for the thesis, Pakistan is there, and he has not even attempted to discover its real roots. Over all his Indian chapters, indeed, there hangs an air of unreality; it is not so much that the facts he adduces are definitely wrong (though some of them are), but that his emphases are hopelessly misleading and the general picture confused and inconsistent; alike in his deductions from Mohenjo-daro and his estimates of modern economic conditions, which appear to suffer from a lack of a critical understanding of the sources. We read (p. 80) that only 67 per cent. of the cultivable area of Bengal is cultivated (an estimate which appears to take the old 'culturable waste' at face value and to neglect fallows); but later (p. 285) we learn that "in Bengal the marshlands are being made safe for agriculture," possibly a reference to the Damodar project but anyhow misleading. The nine pages devoted to Burma contain the same number of definite inaccuracies, none individually of much importance but cumulatively disquieting. Mr. Payne's ideas of general history and geography, to which he makes constant appeal, are not a little confused; he can speak of "wandering villeins," while the geographer will be surprised at the contention (p. 18) that "In Asia the frontiers are least natural; between all Asiatic nations there are broad belts of no man's land. . . ."

These are details: what of the validity of the main theme? Is Asia really one, its nationalisms superficial and ephemeral? Should its population double, will

its resources really give it power proportionate to its numbers? How far can old societies and new machines be reconciled? How strong are the seeds of democratic living? On all these questions the author is abundantly stimulating, but he speaks the language of faith rather than of fact. He ridicules, legitimately and effectively, the crazy paper "planning" of Sun Yat-sen and Chiang Kai-shek, with its ludicrously precise and utterly unintegrated targets; but while he himself is cautious enough to avoid figures, his own visions of potentialities are too often impressionism masquerading as evidence. He enunciates eight propositions relating to education, land reform and democratic procedures which are essential to the success of the revolution and to the desirable marriage of East and West. Nobody will disagree with their excellently liberal aspirations, but there is precious little sign of their implementation. The most constructive suggestion (p. 285) is for the establishment in Britain and America of special universities for eastern students, concentrating on technological and social studies—and western history.

To those who hold, with Mr. Payne and this reviewer, that all men are brothers, there is in truth much that is exhilarating in the revolutionary scope and tempo of events in Asia; but in the midst of this gigantic release of energy we cannot yet see whether the turmoil which envelopes and involves Monsoon Asia is the prelude to renaissance or to disintegration; whether in fact it is revolution, or merely revolt. It is perhaps safe to say that, externally, the former is true; internally it is more doubtful. It is perhaps vain to wish for a sobriety which might have detracted from the individuality and drive of 'The revolt of Asia'; but had it been a sadder book it would have been a wiser, and then, perhaps, great in keeping with the greatness of its theme. O. H. K. S.

THE ANCIENT NA-KHI KINGDOM OF SOUTHWEST CHINA. By Joseph F. Rock. (Harvard-Yenching Institute, Monograph series volumes 8 and 9.) *Cambridge, Mass.: Harvard University Press* (*London: Geoffrey Cumberledge*), 1947. 10×7 *inches; two volumes* xx+554 *pages; maps and illustrations.* £9 12*s* 6*d*

This important work, composed, as its author tells us, in large part amid the difficult conditions occasioned by the recent Sino-Japanese War, is the fruit of twelve years of most thorough and painstaking preparation. It aims at a minute description, topographical, geological and historical, of a remote corner of the Sino-Tibetan borderland—mainly the northernmost part of Yünnan Province with the adjacent areas of Hsich'iang and Ssuch'uan. It is a region of peculiar difficulty because of its rugged mountainous surface, traversed by the upper waters of great rivers like the Yangtsze and the Salween which flow through deep canyons, seldom visited by travellers and by none so thoroughly explored and described as by Dr. Rock himself. Other aspects of this region—its flora and fauna, the customs and language of its peoples and their physical characteristics—are dealt with more slightly, and evidently constitute a minor part of the writer's plan. So much is this the case that one highly interesting and, possibly, ethnographically important paragraph on the moral customs of the tribe principally in question has mention in an extensive and meticulous index under one head only, and that not where it will be most naturally sought.

To some extent then the title of the work may mislead. Even history, which nevertheless bulks largely in the work, is secondary in the author's interest to the geographical description. Dr. Rock has equipped himself for the task, not only by a thorough acquaintance with the Chinese, Tibetan and Na-khi languages, and a careful collation of the accounts of earlier travellers, but more notably, by seeking out rare Chinese works on the country and its peoples. Many

of these works exist only in manuscript or in unique exemplars; the author's service in tracing and making known such works, large parts of which are here given in translation, in itself merits gratitude.

The Na-khi or Na-shi, more familiar to most general readers under the Chinese designation of Moso, are an interesting people, speaking a language often grouped with the Lolo dialects, and closer to Tibetan than to Chinese, to which latter however it seems to approach somewhat in its more developed tonal system. Now existing in infertile tracts as broken tribes, whose corporate existence has been destroyed by a short-sighted Chinese government, and continually harassed by Tibetan brigands, they must once have possessed a higher culture than their present, as is shown by the many manuscripts of an older form of their language which our author has been able to collect. On the side of religion also, since many of them still adhere to the old pre-Buddhist Bön cult once current in Tibet itself, their practices deserve study, and may throw much light on the development of northern Buddhism. The dialect in which Na-khi names are quoted is very near to, if not identical with, that exemplified by Dr. Fu Mao-chi in his recent papers in *Studia Serica*.

Too much praise can hardly be bestowed on the painstaking exactitude with which Dr. Rock has fulfilled his task. Every geographical and almost every personal name is accompanied by its spelling in Chinese characters, and many by the name in Tibetan script, or at least by a representation, often translated, of the modern Tibetan or Na-khi sounds. Names given by earlier travellers are compared and corrected and identifications discussed; the transliteration system is not phonetically exact but is self-consistent. Moreover, the proof-readers and publishers deserve high praise in respect of the careful typesetting, whereby it comes that a deliberate search has failed to lead to as much as one misprint in the languages quoted. (The only printing fault discovered is in an English word on p. 401.) Not the least valuable part of the presentation is the excellent series of 256 photographic plates illustrating topography, historical figures, and tribal types; and four excellent sectional maps.

Dr. Rock has produced a work which, if less likely to be attractive to the general reader than that of his predecessor, Major Davies, covers a narrower field with definitive exactitude. It is difficult to foresee a time when these volumes will cease to be the standard work of reference on all matters within their scope; while they give an indispensable background for further studies of an interesting people. We shall await eagerly the appearance of the further volume promised by their author, in which Na-khi social culture and religion will be treated. R. A. D. F.

MALAYA'S FIRST BRITISH PIONEER: The life of Francis Light. By H. P. CLODD. *London: Luzac and Co.*, 1948. $8\frac{1}{2} \times 6$ *inches;* xiv+166 *pages; illustrations.* 12*s* 6*d*

This book is a well-written and long overdue biography of one of our many forgotten empire-builders, the founder of Penang, first of the three possessions which afterwards became the Crown Colony of the Straits Settlements, the other two being Singapore (1819) and Malacca (1824).

Francis Light, a Suffolk man born in 1740, commenced his career in the Royal Navy but at the Peace of 1763 finding his occupation gone after four years' service, like many other naval officers, turned to the Merchant Service as a means of livelihood. He obtained a passage to India in 1765 and soon after his arrival was given command of a "country ship" belonging to Messrs. Jourdain, Sulivan and De Souza of Madras. For a time Light was the firm's agent at Acheen in Sumatra but went over to Kedah, a state in Malaya, on receiving an

invitation from its Sultan early in 1771. The latter, who was anxious to have military assistance against his enemies, offered the port of Kedah to Light, who was quick to see its possibilities as a calling place for the East India Company's ships bound to China and did his best to persuade his owners to accept. As they were unable to promise military help Light wrote to the East India Company pointing out the desirability of accepting the Sultan's offer. This led to the despatch by the Company of a mission under the Hon. Edward Moncton in 1772, but as the Sultan stipulated for an offensive military alliance to which the Company could not agree, the negotiations came to nought. Light, disappointed, then retired to Junkceylon, an island off the west coast of Malaya, from which he made many trading voyages, some of them in his own ship the *Speedwell*, including at least three to Siam. On one occasion in 1783 the *Blake*, which he commanded, was captured by the French admiral Suffren, but soon afterwards retaken by the British. "Light's acumen" (p. 33) must surely refer to that shown by the French prizemaster of the *Blake* who deceived his British captors as to the whereabouts of the French fleet, which Light would have had no object in doing.

Light, having tried without success to persuade the Company to occupy Junkceylon, returned to Kedah in 1786 and, reopening negotiations with the Sultan, was at last successful in obtaining a grant of the island of Penang. This time the East India Company acted with more vigour and Light was appointed Commander of the *Eliza* and Superintendent of Penang. With two other ships, the *Prince Henry* and *Speedwell*, Light sailed from Calcutta and after calling at Kedah, to confirm the grant by treaty, arrived at Penang on July 16. On 10 August 1786, the East Indiamen, *Vansittart* and *Valentine* arrived, and on the following day possession was taken of the island in the name of His Britannic Majesty; the Company's ships, artillery and marines firing a royal salute. The colony prospered and after seven years of occupation had outstripped in population, trade and revenue the settlement of Bencoolen in Sumatra, which had been in British possession for one hundred and fifty years. Light successfully defeated a Malay attack in 1791 but received little support and encouragement during his administration from the Government at Calcutta or from the admiral on the station (Cornwallis). At last, worn out with worry and overwork, he succumbed to malaria on 21 October 1794. Light was buried in the Protestant cemetery and in 1939 a statue was unveiled at Fort Cornwallis by Sir Shenton Thomas, Governor of the Straits Settlements. This statue was removed by the Japanese but was again set up and unveiled by the British on 11 August 1946, the one hundred and sixtieth anniversary of the settlement's foundation.

There are a few little discrepancies with regard to dates and "1771" on pages 22, 29 and 36 should be "1772." The book is illustrated with reproductions of old water-colours including one showing the occupation ceremony in 1786, with Light reading the proclamation. This is the only portrait, such as it is, that we possess of him. J. W. D. P.

STRUCTURAL HISTORY OF THE EAST INDIES. By J. F. H. Umbgrove. *Cambridge: University Press*, 1949. 12½×10 *inches;* xi+63 *pages; maps, diagrams and illustrations.* 30*s*

Here is virtually the original text of six lectures given in 1946 to students of geography, geology and geophysics in the University of Cambridge. As far as geographers are concerned, those interested in oceanography and geomorphology will find a great deal to interest and stimulate them; but this is not a book for the general geographical reader.

Professor Umbgrove's aim is to solve some of the problems, such as the

origin of the double row of island-arcs and the distribution of volcanoes, which have worried structural geologists since Suess's day. The author marshals a formidable array of compressed data dealing in turn with the morphology and bottom deposits of the "Shallow Seas" and their coral cays; with "Deep-Sea Basins and Troughs"; with the "Volcanoes," including an important discussion of the inter-relations between volcanism, plutonism and tectonics; with the "Structural Zones," a rapid survey of the stratigraphic and tectonic history since the Devonian; and with "Geophysics," giving the data from seismic and gravimetric investigations. It is not clear why the account of the positive isostatic anomalies is relegated to the final lecture, "Synthesis." The author had no time to criticize any of the many solutions already suggested, but it is clear that he does not plump for any form of "Wegenerism." His own answer, put forward with disarming modesty, is based on the well-known theory of Vening Meinesz, that demands a sharp downfolding of the sial, along the zone of negative isostatic anomalies, caused by strong crustal compression. Space is lacking in which to comment on Professor Umbgrove's conclusions; but the problem of Sumba Island, on which considerable stress is laid in the main body of the text, is not satisfactorily elucidated (p. 52) and still remains a troublesome fly in the ointment. It is disappointing that lack of data still precludes the determination of the fate of New Guinea's "spinal column" west of the Vogelkop. The photographs, drawings, schemas and maps (despite the fact that very few of the latter show any geographic coordinates, and many no scales) are excellent, and are veritable lectures in themselves.

Two final points deserve mention: in the last lecture, "Synthesis," there is an irritating and misleading use of the word "wave" when the writer intends "warp" or "fold." Secondly, the author's own term, "idio-geosyncline" occurs in three figures and in three places in the text before its definition on page 55, and will puzzle those who see it for the first time. Whether one agrees or not with his suggested solutions, our gratitude is certainly due to Professor Umbgrove for a most admirable synopsis of our present knowledge of this restless region.

J. B. H-L.

## AFRICA

GOLDSWAIN'S CHRONICLE. Edited by UNA LONG. (Van Riebeeck Society Publications, vol. 27). *Cape Town: The Van Riebeeck Society*, 1946. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches;* xxi+173 *pages; map and illustrations. To members* 12*s*

Jeremiah Goldswain was a young labourer of Great Marlow, Buckinghamshire, who came in 1820 to the Albany district on the eastern frontier of the Cape of Good Hope. He was one of the assisted emigrants in a scheme designed by the British Government to fill an area recently devastated by Xhosa (Kaffir) incursions. It was believed by those responsible for this scheme that the settlement of some 4000 men, women and children in this contentious frontier region would demonstrate an effective occupation that might prevent further Xhosa aggression; the long series of murders, forays and wars that continued on the frontier showed how grievously mistaken was this view. Men and women from the peaceful towns and villages of Britain found themselves translated to a raw and dangerous frontier zone, while the unfamiliar climate and soil often caused unfavourable responses to farming practices evolved in Great Britain. The Chronicle is "an honest record of the life of a British labourer in Albany during the first years of the settlement," and was written by Goldswain in unusual syntax and spelling which probably approximates to a faithful and phonetic rendering of the Buckinghamshire dialect which he spoke. Here then

is a plain tale of pioneer settlement in which the early adjustments between man and environment are seen developing. It was a long and hard struggle before trial and error taught how best to use the land. Fine stands of wheat were blighted by rust in the humid summers, flourishing crops of maize were devoured by locusts, there were droughts and floods. The Xhosas lifted their cattle and pillaged their homes. But with quiet determination they replaced what they had lost, tenaciously striving for the mastery of an environment that only needed peace and perseverance to reveal its latent potentialities. The rough bush trails sketched out by Goldswain and his fellows have hardened into highroads. Cattle and sheep, pineapple fields and citrus orchards now flourish where the settlers first set plough to the sod.

Miss Una Long has added considerably to the interest and value of the narrative by her numerous annotations and informative appendices. The publication this year of the second and concluding portion of the Chronicle will add to our understanding and appreciation of the part played by the British Settlers of 1820. Their story contains the essence of the historical geography of the eastern Cape frontier. V. S. F.

JOURNALS OF BRINK AND RHENIUS. Edited by E. E. Mossop. (Van Riebeeck Society Publications, vol. 28.) *Cape Town: The Van Riebeeck Society*, 1947. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches;* xiv+153 *pages; maps and illustrations. To members* 12*s*

This is the fourth book in which Dr. Mossop has presented the results of painstaking researches in the field and in the Archives into the details of expeditions made by early Cape travellers. He personally followed their footsteps and his identifications of their routes are far more reliable than could have been obtained by a mere armchair study of the problems. Thus the introduction, copious footnotes and appendices of this volume are of exceptional value. The first and longer journal, that of Surveyor C. F. Brink, is of an expedition by land in 1761–62 from Cape Town into what is now South West Africa. It is printed in the original Dutch with a parallel English translation. The expedition was initiated and led by Hendrik Hop, an influential farmer of the Stellenbosch magistracy, and was supported by the Dutch East India Company's representatives at the Cape. Hop wished to investigate a report that about sixteen days' journey north of the Orange river there dwelt a tawny-complexioned long-haired people who were clad in linen, and to locate these people; for the possible furtherance of the Company's and the Colony's trade was the prime purpose of his journey. Brink was sent to map the route, and a surgeon and a botanist were instructed to report upon minerals and plants. The possibility of using giraffes as beasts of burden was to be investigated, and one was to be obtained alive or dead.

The expedition only became truly exploratory some 60 miles north of the Orange river and, after about another 150 miles through difficult country, the turning point was reached at Grundorn. This place is shown in modern maps at approximately 26° 43′ S., 18° 48′ E., but is given (p. 52) as lat. 26° 85′ (*sic*) and placed at about 26° 35′ on the end map. Lack of grazing and of water for their draught-oxen chiefly caused their return. They left unsolved the identity of the nation for whom they had searched. (It has been suggested that they may have been people of Portuguese extraction who had penetrated up the Zambezi valley to the Lake Ngami area). It is regrettable that Brink's map of the expedition was found to be insufficiently distinct for satisfactory reproduction in this volume. The journal of Ensign J. T. Rhenius records a far shorter journey made in 1724 to barter cattle and sheep from the Hottentots north of Cape Town.

Students of the early history, geography and ethnography of South Africa are indebted to Dr. Mossop for this latest addition to his published works on the period. V. S. F.

NEW SONG IN A STRANGE LAND. By ESTHER WARNER. With 70 woodcuts by JO DENDEL. *London: Victor Gollancz*, 1949. $8\frac{3}{4} \times 6$ *inches;* 302 *pages.* 16*s*

There is no sub-title to this book and the title does not give the slightest indication of its contents. Actually it is a lively account of the experiences, in Liberia, of the wife of a botanist on a rubber plantation some thirty miles inland from Monrovia. The author gives a picture of the discomforts of West Africa and of its compensations and interests; of the life led by the white folk in "an island of transplanted America"; of the jiggers, the fevers, the tropical ulcers; of the natives of the interior and their relations with the American-Liberians, of whom there are not more than twenty thousand or so in a country which holds a million or two indigenous natives.

The author writes with much sympathy of the art of the native craftsmen, as shown in their wood carving, which she herself can appreciate all the more as she is apparently a sculptor herself. Although the many woodcuts in the book are interesting and decorative, they have not the authentic value that we should find in photographs of native types and native wood masks. She describes another form of native art, namely, the casting of brass images by the *cire-perdue* process. She has a high opinion of the ancient artistic culture of the native carvers and of their power to seize the essential features of a subject.

She made an expedition into the interior, as far as Ganta, where she stayed with Dr. and Mrs. Harley. She gives some account of the "Poro," or initiation ceremony for boys on reaching manhood, and refers to the work of Dr. Harley on this subject. And she deals in a friendly way with native ideas and customs, though she does not mention the cannibalism which was supposed to be practised in the recent past by indigenous races in the forest belt. C. F. A.-C.

THE BIRDS OF TROPICAL WEST AFRICA. Vol. VI. By D. A. BANNERMAN. *London: Crown Agents for the Colonies*, 1948. $10\frac{1}{2} \times 7$ *inches;* xxxix+364 *pages; diagrams and illustrations.* 35*s*

This volume, completed in 1947, will be welcomed by a host of ornithologists and travellers, for it is eight years since the last appeared. The war's delays have however enabled Dr. Bannerman to make excellent use of notes compiled by many new observers who found themselves in West Africa on service in those years. He deals here with the Tits, Crows and Starlings, the Sunbirds and some allied families, the Oxpeckers and the rare Rock-Fowls, the Finches and the Buntings. The book is a model of accuracy, combined with lucid and easy description. Naturalists in other portions of the Empire will envy the West African student not only the space which Dr. Bannerman has been able to devote to each species, but the admirable illustrated key.

The illustrations, which include coloured plates by the doyen of bird-artists, Mr. George Lodge, the late Henrik Grönvold, Mr. Philip Rickman and Mr. Roland Green, have the same clarity and distinction as the text, and if the reader has any regret, it is that he wishes so often to refer to maps contained in the earlier volumes, which are now almost unobtainable.

As Sir Bernard Bourdillon remarks in a foreword, ornithology is "*par excellence* the relaxation suited . . . to men who . . . spend much of their time in lonely stations," especially in a country as rich in bird-life as it is climatically unpleasant, and none will grudge the space which this book takes up in their kit.

It is good news that the two remaining volumes of Dr. Bannerman's great work are now ready for printing. The Crown Agents are to be congratulated on getting this book so admirably reproduced. J. K. S.

RÉGIME DE QUELQUES COURS D'EAU D'AFRIQUE ÉQUATORIALE et étude de leur utilisation industrielle. By P. DARNAULT. *Paris: Editions Larose*, 1947. 11×7½ *inches;* xi+134 *pages; maps, diagrams and illustrations.* 500 *fr*

The author writes with both the academic and practical authority of one who holds a Doctorate of Engineering and who knows French Equatorial Africa intimately in his capacity as Chief Engineer of Public Works in the French Colonies. Here are brief but valuable, because rare, notes on the *physique* and climate of French Central Africa generally, with particular reference to certain river-basins including those of the Congo–Ubangui, middle Congo, Loémé, etc.

The whole is comprised within little more than 100 pages and is designed primarily to encourage the study of the hydro-electric possibilities of the French Central African rivers and of their economic development, in the interests of France. Unlike the British African Empire, where it is the current British fashion to emphasize that Africa should be developed primarily in the interests of the indigenous population, the men of France are much more outspoken regarding the possibilities of Africa from the standpoint of the existing and future needs of France. At the same time the sympathetic interests of France in African native life are not necessarily more reactionary or less sincere than our own.

Very little work on the hydrography of French Central Africa has been achieved since the Roussilhe Hydrographic Mission of 1910–11, and Dr. Darnault's work is of exceptional value as a pioneering effort, as a study of his remarkable field sketch-maps of particular river-basins will reveal. Each river discussed receives a preliminary survey from the standpoint of its régime, with the aim of suggesting the possible contribution of electrical energy. Projects are envisaged for the transport of electrical power from the Gabun Colony to North Africa and so to metropolitan territory. W. F.

## NORTH AMERICA

LAND IN CALIFORNIA. By W. W. ROBINSON. *Berkeley and Los Angeles: California University Press* (*Cambridge: University Press*), 1948. 8½×5½ *inches;* xiv+291 *pages; sketch-maps and illustrations.* 22*s* 6*d*

This volume, by a recognized master of his subject, deals with "land ownership in California from the days when the Indians were in possession to the present." It discusses in a pleasant, scholarly manner the acquisition of estates by individuals or groups of individuals and clearly demonstrates the interactions of land-holding and the distribution of population.

From the Indians, whose fading estates are discussed with much sympathy, the author passes to the Spanish missions and emphasizes the intended temporary nature of their sites and their magnetic effect on contemporary Indian settlement. The planned establishment of *presidios* and *pueblos* proper, from which arose San Francisco, Los Angeles and a few other cities, are described in intimate detail, as also are the first ranches some of which are illustrated with copies of their original plans. The valuable work of the Land Commission in straightening out the chaos of land-claims and titles is concisely appraised and is followed by an account of the invasion of squatters and of the struggles to evict them—a thousand fantastic skirmishes ranging in intensity from shotguns to minor cannon. A discussion of mining claims arising from the gold

rushes, and of the great land grants to the railways, "in theory, up to 12,800 acres" per mile, precedes a description of the rush for small estates following the Homestead Act of 1862. After mentioning the present-day conservation of land by the state the author gives details, by no means tedious but often hardly geographical, of the various types of land-allocations (including swamp, marsh and tidal areas), and of the assurance of land-titles. The volume concludes with the "title stories" of San Francisco and Los Angeles and with a thorough bibliography.

This well produced book is a worthy and necessary member of the "chronicles" commemorating the state's centenary in 1950. Although a few of the chapters may lie outside the realm of geography, the geographer will find in the greater part of the volume much matter vital to the study of settlement and settlements in California, for the nature of land-holdings has been a prime factor in the shaping of the present population-map of the state. R. P. B.

## AUSTRALIA AND PACIFIC

THE LIFE AND TIMES OF SIR JULIUS VON HAAST. By H. F. VON HAAST. *Wellington, N.Z.*, 1948. $9\frac{1}{2} \times 6$ *inches;* xxii + 1142 *pages; folding maps and illustrations.* £3 3*s*

Sir Julius von Haast was a very remarkable man. He was a German and when, in 1858 at the age of thirty-six, he landed in New Zealand he had a somewhat limited command of English. A big man mentally and physically with wide scientific interests, a flair for field work and cultivated tastes in music and art, he crowded into the next thirty years enough achievement for two or three ordinary lifetimes. He contributed largely to the exploration and topographic mapping of south-west Nelson and of Canterbury and Westland; to the geological investigation of Canterbury and Westland culminating in the production of the only comprehensive geological map as yet made of the two provinces; to the creation and development of the Canterbury museum and its association with the Canterbury University College (of which he became the first professor of geology). These achievements and the constant flow of his research papers to New Zealand and overseas periodicals were recognized by the award to him of the Patron's Medal of the Royal Geographical Society, by his election to the Fellowship of the Royal Society, by the conferment of an honorary Sc.D. by Cambridge University, and by his elevation to knighthood, both by the Emperor Franz Josef of Austria and by Queen Victoria.

His son has accumulated an enormous amount of material and has produced a lively and fascinating book, better perhaps on Sir Julius's personal relationships than on controversial aspects of his work, though these are treated quite fully. It is however a great pity that the work was not condensed or, alternatively, produced as two volumes—twelve hundred large pages make a volume that almost demands a lectern for comfortable reading!

The book is published by the author, H. F. von Haast, 41, Salamanca Road, Wellington, N.Z. R. O. B.

## POLAR REGIONS

THE COAST OF NORTHEAST GREENLAND, with hydrographic studies in the Greenland Sea. By LOUISE A. BOYD. *New York: American Geographical Society (Special Publication No.* 30), 1948. $10 \times 6\frac{1}{2}$ *inches;* xi + 339 *pages; illustrations and maps (partly in separate case).* $6

Miss Louise A. Boyd is already well known for the numerous expeditions she has financed and conducted into the Arctic in ships chartered by her—particularly

to the alluring fjord region of the east coast of Greenland. The account of her 1933 expedition was published as Special Publication No. 18, 'The Fjord Region of East Greenland,' by the American Geographical Society in 1935. The field of work mainly covered the north side of the head of Franz Josef and King Oscar fjords, and the hitherto unexplored Gregory valley. 'The Coast of Northeast Greenland' is a worthy sequel to the earlier volume and contains the reports of the expeditions of 1937 and 1938, which extended as far north as Ile de France. At government request, publication has been withheld since 1940 for security reasons. Some sections of the book therefore contain no reference to publications that have appeared since the reports were written; thus, no mention is made in the section on Glacial Geology of the notable paper by N. E. Odell (who took part in the 1933 expedition) on the glaciers and morphology of the Franz Josef fjord region.[1]

The photographs in the present work are fewer and perhaps less spectacular than those in the 1935 publication but, in keeping with Miss Boyd's high reputation in Arctic photography, they are of first-class merit, and are carefully pin-pointed by precise descriptions and index maps. One would have liked to have seen more of these photographs reproduced on a larger scale to give a more vivid representation of the rugged features of mountain and glacier; the large and particularly impressive photographs of Agassiz valley confirm this wish. A wide white margin is very distracting around many of the snow-studded Arctic panoramas.

Miss Boyd has herself written the narrative of the voyages as well as other notes, but by far the most important and voluminous section is that by R. F. Flint on glacial geology and geomorphology. It is largely the result of rapid reconnaissance work during the 1937 expedition, but is nevertheless an eminent contribution to Arctic glaciology. South Glacier, Jan Mayen Island, is analysed in detail while several small areas were studied in the Tyroler Fjord district. A disquieting anomaly is that the names of the Copeland and Kløft glaciers in Tyroler valley are not in accordance with the Danish map, and in fact the names appear to have been reversed in Miss Boyd's book. A significant conclusion in this section is that foliation is present in most glaciers and usually shows a synclinal structure; it is probably secondary, rather than deformed stratification inherited from the *névé* field. Evidence is adduced to show that there had been a slight re-expansion since the last general deglaciation, followed by the present rapid degeneration. Emergent strandlines are also described; the remarkable etched bands on the walls of Kempe Fjord, indicating former sea-levels, are unusually interesting.

Special mention must be made of the well-executed maps and sections which are the result of the detailed hydrographical and topographical surveys forming such an integral part of Miss Boyd's expeditions. Continuous soundings were taken both en route to Greenland and in the Franz Josef–King Oscar fjord region by means of the echo-sounder fitted in the *Veslekari*, and in addition a portable instrument was used in a motor dory for sounding in waters not accessible by ship. Topographical mapping was confined to certain areas of importance in the study of glacial recession; nevertheless, the importance of the camera for mapping purposes has been amply demonstrated. The volume also includes an interesting section on the flora, with particular reference to the successional relationships of plant communities. G. T

[1] *Geogr. J.* 90 (1937) 111.

## PHYSICAL GEOGRAPHY

CLIMATE THROUGH THE AGES. By C. E. P. Brooks. Revised edition. *London: Ernest Benn*, 1939. 8½ × 5½ *inches; 395 pages; diagrams.* 21*s*

When 'Climate through the ages' first appeared in 1926 it was deservedly given a full review article [1] in this *Journal*, for it expressed the carefully considered opinion of a great authority, strongly equipped in the three relevant disciplines of climatology, geology and mathematics. In the years between, an already formidable literature has multiplied prodigally. Some theories, such as Wegener's hypothesis of continental drift, have scarcely stood up to searching criticism; new ones, such as Sir George Simpson's theory of variations of solar radiation, have appeared; new techniques, such as pollen analysis, have been fruitfully developed; and Professor Zeuner has entered the field with his careful analysis of the facts and his critical examination of the causes. In assessing these, and other, varied contributions, Dr. Brooks has not found it necessary to alter the form of the book, which is still divided into three parts—(1) The climatic factors, and their variation; (2) Geological climates and their causes; (3) The climates of the historical past. The appendices on the geological time scale and on theories of climatic change are retained, but that on correlation coefficients is omitted since its matter is now widely known.

Nor has Dr. Brooks found it necessary to revise his main conclusions. He is still convinced that "for the occurrence of the ice-age as a whole the geographical theory seems to be the only adequate one." For the Permo-Carboniferous glaciation of low latitudes, too, he reverts with increased confidence to his own "geographical" explanation, in view of the accumulating difficulties and contradictions that beset the continental drift theory. Dr. Brooks' own great contribution to the "geographical" theory has been to apply precise methods to paleogeographical reconstructions and to their climatic consequences. Changes in the distribution of land and sea, changes in height and depth, the resultant modification of oceanic and atmospheric circulation and the sequential stages in the growth and decay of ice-caps and glaciers are traced in detail, logically, critically and often quantitatively. Nobody however could accuse him of unfairness to his rivals. With scrupulous care and exemplary tolerance he states the case for mathematical, astronomical and chemical theories which range from the remotely possible to the mutually contradictory and the palpably inadequate. Some, starting from improbable assumptions, proceed by impeccable mathematical steps to conclusions irreconcilably at variance with the established facts of climatic history. Others, while incapable of accounting for the major contrasts between the "non-glacial" conditions that characterize most of geological time and the rarer (abnormal) "glacial" episodes, are recognized as capable of tipping the scales towards inter-glacial and intra-glacial episodes when the stage has been set, by geographical distributions, for a glacial period.

But in such an embarrassing wealth of theory Dr. Brooks is unable to award the prize, and feels bound to conclude " . . . with possibly some help from $CO_2$. The actual commencement of glaciation may have been determined by some minor factor such as the astronomical situation or changes of solar radiation. . . . Astronomical causes seem to come nearest to fulfilling the necessary conditions (for inter-glacial periods), but alternating depression and elevation, due to the accumulation and removal of the ice-load, are also probable, while cycles of solar radiation cannot be ruled out." Time and new evidence may reveal a germ of truth in each and every theory, and if, in some, the prospect is remote they

[1] "The four ice ages." *Geogr. J.* 70 (1927) 165–8.

are retained for their historical interest. Thus the first two parts become an indispensable guide, not only to the history of climatic variation in geological time but also to the evolution of ideas on this involved and fascinating subject, and to the inexhaustible fertility of the brain of the hypothesis maker.

In Part 3 Dr. Brooks sifts the evidence from all sources bearing on the climates of historical times and finds evidence of well-marked fluctuations of quite appreciable magnitude, which are described continent by continent. Concluding with an examination of their causes, he refrains from dogmatic pronouncements but calls, for explanation, on the interaction of a number of variables, including minor changes in land and sea distribution, astronomical changes and variations of solar activity. While recognizing that other factors, hitherto unsuspected, may be discovered, he protests that there is no necessity to introduce hypothetical agents such as clouds of cosmic dust, strange stars or great disturbances of the earth's rotation. There is an abundance of known and hypothecated causes well able to bring about the observed variations of climate; the questions are still open, which? and how? A. A. M.

## MATHEMATICAL GEOGRAPHY

TRAITÉ DE L'ASTROLABE. By HENRI MICHEL. *Paris: Gautier-Villars*, 1947. 11×9 *inches;* viii+202 *pages; diagrams and illustrations.* 30*s*

Until comparatively recently old scientific and mathematical instruments were left to the curio-hunter, and scientists who took an interest in them and in their makers, ran the risk of being deemed eccentric. But all this is changed, the light they can throw upon the history of science is recognized, and the monograph under review will be eagerly read, for it deals with the astrolabe not as a museum exhibit but as an instrument in use. M. Henri Michel, the author, has himself what must be a unique collection of astrolabes, but he has also a mastery of astronomy, a skill in deciphering ancient texts, and a gift of lucid exposition which have combined to give us a work truly "magistrale et exceptionnelle" as M. Esclangon describes it in the Preface. As former Director of the Paris Observatory, M. Esclangon speaks with authority, so that even the non-mathematical reader who cannot himself check all the reasoning employed may accept the author's conclusions with confidence. The subject is treated under three aspects, historical, astronomical and practical, the third including the actual construction of the instrument. The origin of the astrolabe must be sought at Alexandria in the early years of the sixth century, and the first clear description of it was given by Philoponus, disciple of Ammonius (*fl.* A.D. 500). Dr. Gunther in his 'Astrolabes of the World' printed Greene's English translation of Philoponus, but dated him more than a century late. M. Michel differs also from Gunther in the method to be employed for dating astrolabes from material supplied by the zodiacal calendar usually engraved on the back of the instrument. He demonstrates clearly that an examination of the date of the vernal equinox gives a very uncertain result, whereas by using the observation known as *coeli mediatio* the approximate year of construction is obtainable with a high degree of certainty. It gives, for example, A.D. 1190 for the oldest known "Gothic" astrolabe (Plate 3), while an examination of Saints' names puts the closely similar example at South Kensington as after A.D. 1221. Both these instruments hint at contacts between English clerics and Jewish refugees in the English domains in France soon after Adelard of Bath had brought translations of mathematical works from the Arabic into this country. M. Michel classifies and describes astrolabes as Egyptian (the parent stem), Hispano-Moorish (the western offshoot), Gothic (western European) and Renaissance, followed by

Arabic, Indian and Persian (the eastern offshoot). In addition to the splendid plates, a most valuable appendix is devoted to the known designers and makers of astrolabes. Here the names of several English workers or foreign workers in England occur, and the author surmises a connection between Thomas Gemini, one of whose handsome astrolabes is to be seen in Brussels (perhaps executed by Humfrey Cole), and the workshop of Gemma Frisius' nephews. John Dee, who brought back instruments from Louvain, is perhaps also a link here. Another interesting point is the survival of several mathematical instruments by James Kynvin, the friend of Gabriel Harvey, made about 1595–97, which are now in the Science Museum at Florence. Were they taken to the city by Robert Dudley, himself the designer of a mariner's astrolabe in 1596, when he took up residence in Florence in 1606 and devoted himself to practical mathematics?

E. G. R. T.

GENERAL CARTOGRAPHY. By ERWIN RAISZ. Second edition. *London: McGraw-Hill Publishing Co.*, 1948. 10½×7½ *inches;* xv+354 *pages; maps, diagrams and illustrations.* 36*s*

Originally published in 1938 this general treatise evoked much interest among geographers and cartographers and was reviewed at length by the late Mr. A. R. Hinks.[1] In this revised edition, several new chapters, thorough revision and a new format have somewhat altered the original work.

The first part, dealing with the History of Maps, is the only section which remains substantially the same. Some illustrations have been added and some changed: Table IV, the time chart of modern maps, will doubtless be brought up to 1950 with the next edition. Part 2, covering scales and projections, has been expanded: additional diagrams clarify many points and there is a more detailed treatment of the azimuthal group of projections. Part 3 deals, as in the first edition, with the representation of the earth's pattern on maps. Students of geography will note one important change—the physiographic method of relief representation, largely developed by A. K. Lobeck from W. M. Davis's block diagrams, has been renamed the "morphographic" method in the text (although not in the table which lists the symbols). The subject of Map Reading is elevated to the status of a separate chapter: geographers will find a stimulating and interesting analysis of part of the Alma, Michigan, sheet given as an example. The range of information which may be inferred from the map is surprisingly extensive, but the reviewer would draw a line at providing forecasts of the way farmers are likely to vote at elections on the basis of map analysis! Part 4 deals with lettering, composition and the drafting of maps. The original chapters are revised and brought up to date while a useful list of common duplicating processes has been added to the methods of map reproduction: the insertion of reflex methods would make the list almost exhaustive.

Part 5 covers, in four chapters, surveying on the ground and from the air and is completely new to the book. The treatment in the chapter on ground surveying is familiar, although British readers will note with interest the American approach. The chapter on aero-surveying neatly covers in a necessarily short space the main elements of this newly developed art and science. A chapter follows on "airplane photo interpretation" and this will be found very useful for the beginner. Identification and interpretation of verticals is by no means an easy task; the principles are set out clearly and one could only wish for more pictorial illustrations to demonstrate the many points covered. The author is clearly enthusiastic about air photography but British readers are

[1] *Geogr. J.* 96 (1940) 351.

not likely to be misled by the statement that "almost all large scale maps at the present are the result of airplane photography."

Part 6 deals with official and professional maps. Government maps, charts, and private maps are covered in the first three chapters, much as in the first edition, apart from the omission of the list of topographic maps. The advanced student will perhaps regret this omission but adequate reasons are given for it. The chapter on charts has been improved by an account of position fixing, but the radio-acoustic system has been introduced as a modern method. It was so in the 1930's, but it is doubtful if it will continue to be used with the advent of more recent radio aids. One of these, Loran, is described: it may be noted that Loran position lines are hyperbolic and not parabolic. The final chapter in part 6 deals with Cartography in War and is mainly an account of American work in the Second World War. In view of the wide sales of the book outside the U.S.A. it is perhaps unfortunate that the account is so one-sided. There are indeed several graceful references to British contributions and activity but few actual details are given; probably the latter are in part still difficult of access. The invasion of Normandy, alone, involved the preparation, in Great Britain, of over 120 million maps for the land forces and the distribution to the naval forces of over a million specially produced charts.

Part 7 deals with the use of Diagrams, Statistical Maps, Cartograms, Globes and Models under the heading of "Cartographic Specialties." The section on globes now includes a useful description of the analemma; we also note with interest that the Babson Institute of Wellesley, Mass., is to attempt a model of the earth on a scale of 1:1,000,000 using the Millionth map of the world as a base. This globe will have a diameter of 42 feet when complete. Recent developments in model making are also given and one notes, with perhaps a little surprise in these days of shortage, the use of pearl barley as a constituent base medium. In part 8 are now grouped, under the general heading of "Science Maps," methods of land-slope analysis, land use and economic maps (this has been considerably revised), geological maps and block diagrams. An innovation in this edition is the insertion of a set of eight useful cartographical tables, while the bibliography of easily available references is much expanded. British contributions are well represented although the discerning reader will note one or two small errors.

The book is again well produced on white glazed art paper throughout and this new edition, over a third longer and with half as many more illustrations, is likely to consolidate still further the unique position of the book in the field of cartography. All students of geography and cartography will want it on their bookshelves. W. G. V. B.

TOPOGRAPHIE. By GENERAL DE FONTANGES. *Paris: Armand Colin*, 1948. $6\frac{1}{2} \times 4\frac{1}{2}$ *inches; 224 pages; diagrams and illustrations. 150 fr*

This little book covers the geodetic, topographic and cartographic operations used by the French for their national maps and plans. The subject is, of necessity, only briefly treated, and only French practice is considered. The book is however of considerable interest to the British reader. It is divided into two parts. Part 1 deals with the reading and use of maps, and with topographical instruments and procedures. Part 2 covers the construction of topographical maps. Throughout the text, smaller type is used for secondary matter, which though of interest is not vital to the argument. This is a useful feature. If topography is a science which exacts a long initiation, both theoretical and practical, at least the resulting maps are accessible to all, and their use is spreading in this modern age. The information that can be obtained from maps

is greatly enhanced by a knowledge of the processes by which they are made and this little book gives a good general picture, and also quite a few details, of the art of map making. Exactly what information can be extracted from topographical maps, how the numerous problems involved in faithfully representing the surface of the earth have been resolved, what instruments are used to this end, how they are used, what constitutes the geodetic, topographic and cartographic operations—all these questions and many others are clearly answered. The history of cartography is traced from its first beginning, right up to the most recent procedures of phototopography. Accompanied by sketches and photographs of essential apparatus, which render the treatment of the subject still clearer, 'Topographie' should find a place in the library of the student, the geographer, the engineer, the tourist, and of all whose activities lead them to use topographical maps. D. I. B.

## SOCIAL GEOGRAPHY

URBAN GEOGRAPHY. By GRIFFITH TAYLOR. *London: Methuen*, 1949. $8\frac{1}{2} \times 5\frac{1}{2}$ *inches;* xv+439 *pages; sketch-maps, diagrams and illustrations.* 25*s*

A Scotsman has vouched for it that there is "fine confused eating" in a haggis. And there is some fine confused reading in Professor Griffith Taylor's new book: the confusion to be explained, perhaps, by the fact that ideas chase one another so fast across his mind that he has no chance to pin them down and examine their validity. The list of his earlier writings fills a page, beginning modestly with a little geological memoir published at Adelaide in 1910, but ending with books on sweeping themes such as 'Environment and Nation' and 'Our Evolving Civilization' written during the recent war. For as a young man Griffith Taylor came under the influence of Dr. A. J. Herbertson, and has ever since proclaimed himself a believer in the environmental control of human affairs: "If he [man] is to prosper" he writes "he does well to choose what Dame Nature the Dictator indicates is the best for him " (p. 22). Yet we do not find that this dictatorship cuts very deep. The author tells us, for example, that the site at Cape Evans which Captain Scott chose for his base camp in 1911 affords "one of the best examples of environmental control known to the writer." But the simple fact was that there was thick bay-ice south of Cape Evans, and the ship could sail no farther: we will grant that this was "control." When however on the following page he terms Scott's Camp a "Communal Settlement," adding "since it reminds one of the similar settlements in Jugoslavia in the late Middle Ages," we find his line of thought impossible to follow. It appears that we cannot expect from the author any clear lead upon the classification and comparative study of urban settlements and the book must be read for its factual content and profuse illustrations. It is of course of very great importance that we should study both the geography and history of towns, since migration from country to town, and from small town to great city has become an almost world-wide phenomenon. Moreover the selection of sites for new towns in this country often suggests that our professional planners believe that towns "spring up" at random, originating "for no other purpose" as Thomas Sharp puts it "than to house free citizens as comfortably and pleasantly as . . . possible." They do not perceive the clear-cut functional distinction between the village and the town, between the country town and the metropolitan city. Nor does Professor Griffith Taylor, who has ignored the penetrating studies of Gordon Childe on the nature of the Urban Revolution, and the conclusions reached by the late Henri Pirenne and writers of his school on the origins of the cities of Western Europe. Indeed his criterion of urban character is mere size (p. 5) and

he writes: "the giant city of to-day . . . has passed through the early stages of pioneer dwelling, village, town, city and metropolis, before it reached to-day its present self-suffocating position." This idea of the city as evolving from the village is the more strange as Griffith Taylor, in 1910, took part in the preliminary survey of the site of Canberra, founded as a Federal Capital. It is perhaps unfortunate that practically all his experience is of new countries, Australia, the United States and Canada (in each of which he has held Chairs of Geography) which were colonized by peoples with an advanced urban habit and tradition, and in which in consequence original phases of city history are missing. The culture stage of its founders must obviously be taken into account side by side with the function of a settlement if comparative analysis is to be attempted, whether of site or layout. And so, to the reviewer at least, it appears waste of time to set side by side (as is done for the purpose of demonstrating "latitude control") such diverse human agglomerations as Scott's camp at Cape Evans (25 inhabitants), Bergen (100,000), McMurray in the Canadian Forest (500), Pekin (1,600,000), Biskra (4000), Urandji, a cattle-station in Australia (50), and Santa Maria in Colombia (30,000). Little wonder that in this connotation Pekin proved baffling to the author, and that he is half inclined to throw it to the "possibilists," since he finds himself unable to relate its site to "any marked environmental factors." The fact that Professor Taylor uses the terms town, hamlet, township as freely interchangeable confirms the view, if confirmation were needed, that precision of statement is not to be expected of him, for the very fact that their meanings differ on opposite sides of the Atlantic (and this book is compiled from his university lecture notes) emphasizes the need for clear definition. What can anyone, English or American, make of such a statement as "Another political unit in England is the County Borough, which is an urban district separated from the rest of the county for administration purposes *and acting much like a town in this respect*." (the italics are ours)

However, as the author acknowledges, this is a pioneer work so far as the English language is concerned, and since he has drawn together scores of studies of individual towns all over the world and added a bibliography (largely of American sources) there is plenty of material from which the reader can draw his own conclusions and attempt his own scheme of classification. The maps and diagrams are of the type with which the author has long made us familiar, full of ideas and novelties, but lacking just that care and finish, that concern to view them from the user's standpoint, which would so enhance their value. The Londoner, for example, will open his eyes wide at Fig. 83, and will be still more startled to read (p. 402) that "The British city is in chains to the landed aristocracy. This group refuses to endow it with home rule, and watchfully supervises every grant of power to insure that its own property and privileges will be protected. . . . The cost of this class control of cities is colossal. It is seen in the indebtedness of the towns, and in the burdens imposed on municipal enterprise. Most of all it is seen in the poverty of the cities." This is how our country is pictured, seemingly, to young America! The reviewer is irresistibly reminded of an occasion when she heard sighs and murmurs of pity from a group of Russian Eskimo and Chukche girls who had just been told that she came from England, that land of hardship, cruelty and corruption! E. G. R. T.

# ADDITIONS TO THE LIBRARY AND MAP ROOM

## EUROPE

LA NAVIGATION INTÉRIEURE EN GRANDE-BRETAGNE

By Jean Doise. (Extr. fr. *Navigation du Rhin*, 20 (1948) 53–61; sketch-maps and illustrations)

THE GEOGRAPHICAL BASIS OF A COUNTY PLAN

By E. G. R. Taylor (*J. Town Planning Inst.* 35 (1949) 49–52; sketch-maps.)

A brief analysis of Sussex and Gloucestershire, emphasizing the importance of taking into consideration external as well as internal relationships.

A PLAN FOR BATH

By Sir Patrick Abercrombie, J. Owens, and H. A. Mealand. 12×10. viii+120 pp. Maps and illustrations. *London: Sir Isaac Pitman*, 1947. 30*s*

SOME FACTORS INFLUENCING THE GROWTH OF BIRMINGHAM

By M. J. Wise (*Geography* 33 (1948) 176–90; sketch-maps)

THE NEW RED SANDSTONE OF SOUTH DEVONSHIRE

By J. B. Scrivenor. (*Geol. Mag.* 85 (1948) 317–32; illustrations)

FLOODS IN A LAKE DISTRICT VALLEY

By J. Sharp. (*Compass* 1 (1948) 3–20; diagrams)

Study of the causes and effects of flooding in Patterdale. This is the first number of the magazine of the Cambridge Univ. Geographical Society

THE WASHINGTONS AND THE MANOR OF WARTON

By T. Pape. $8\frac{1}{2}\times5\frac{1}{2}$. 96 pp. Map and illustrations. *Morecambe: "The Visitor,"* 1948. 7*s* 6*d*

Traces the ancestors of the Sulgrave Washingtons back through Warton, Lancs., and Westmorland to Washington in Durham, and gives a short history of the manor of Warton.

THE WEALD AND THE FIELD SCIENCES

By S. W. Wooldridge. (*Advancement of Sc.* 6 (1949) no. 21, 1–11; maps)

SOME VARIATIONS IN THE COAL MEASURES OF YORKSHIRE

By W. H. Wilcockson. (*Proc. Yorks. Geol. Soc.* 27 (1947), 58–81; diagrams)

LOUIS ALBERT NECKER, OF GENEVA, AND HIS GEOLOGICAL MAP OF SCOTLAND

By V. A. Eyles. (*Trans. Edinburgh Geol. Soc.* 14 (1944–6) 93–127; map and portrait)

This, the first geological map of the whole of Scotland, was prepared in 1808 and presented to the Geological Society of London. A reproduction accompanies the paper.

AN HISTORICAL BACKGROUND OF VILLAGE DEVELOPMENT IN SCOTLAND

By J. M. Houston. (*J. Town Planning Inst.* 35 (1949) 87–95; illustration)

THE OUTER HEBRIDES IN RELATION TO HIGHLAND DEPOPULATION

By W. A. Hance. $8\frac{1}{2}\times5\frac{1}{2}$. 148 pp. (litho-printed). Maps. *New York*, 1949

ORIGIN OF THE JURA MOUNTAINS

By J. H. F. Umbgrove. (*Proc. K. Nederl. Ak. Wetens.* 51 (1948) 1049–62)

DANUBIA: OLD AND NEW

By Oscar Jászi. (*Proc. Amer. Philos. Soc.* 93 (1949) 1–31)

A study of conditions in Austria, Czechoslovakia and Hungary, based on a visit in Aug.–Nov. 1947

ZUR GEOGRAPHIE DES GETREIDBAUES IN NORDTIROL

By Hans Telbis. (*Schlern-Schriften, Innsbruck*, no. 58) $9\frac{1}{2}\times6\frac{1}{2}$. 148 pp. Diagrams. *Innsbruck: Univ.-Verlag Wagner*, 1948

A detailed study, with statistical tables and distribution maps, of grain cultivation in North Tirol. The arable forms less than 5 per cent. of the total area. Except at higher altitudes, conditions are not unfavourable for grain crops, and their low proportion in the arable is due to the demand for fodder, following on the development of cattle raising. In the last decade the greatest decreases in cultivated area have been in rye and oats, the smallest in wheat.

KØBENHAVNS INDUSTRIS LOKALISERING

By Grethe Forchhammer. (*Geogr. Tids., Kjobenhavn*, 48 (1946–7) 74–109; plans)

DIE MORPHOLOGISCH-TEKTONISCHEN URSACHEN DER DILUVIALEN VEREISUNG NORDDEUTSCHLANDS

By W. Evers (*Deut. Geogr. Blätter* 45 (1949) 7–24)

FORMATION DE LA VALLÉE DE L'OLT

By B. Bulla (*Földrajzi Közlemények* 76 (1948) 11–23; in Magyar, German summary)

L'INSEDIAMENTO UMANO NEI BACINI DEL CESANO E DEL MISA (MARCHE)

By Eugenia Bevilacqua. (*Boll. Soc. Geogr. Ital.*, ser. viii, 2 (1949) 9–26; maps)

A study of the growth of population since the seventeenth century, and its present distribution, particularly in relation to altitude.

DE WATEREN VAN NEDERLAND AARDRIJKSKUNDIG EN GESCHIEDKUNDIG BESCHREVEN

By A. A. Beekman. 11×8. viii+284 pp. *'s-Gravenhage: Martinus Nijhoff*, 1948. [34*s*]

A useful reference work, arranged alphabetically, on the rivers and waterways of the Netherlands, mainly from the historical aspect.

JAURRIETA: un pueblo interesante para la geografia de los paisajes humanizados

By Leoncio Urabayen. (*Estudios Geogr.* 9 (1948) 377–420; map and illustrations)

Study of a settlement in Navarra, which has prospered by intensive cultivation of the potato.

EL PRINCIPADO DE ANDORRA: resumen geografico

By Salvador Llobet. (*Pirineos* (*Zaragoza*) 2 (1946) 5–52; illustrations)

DER SCHWEIZERISCHE AUSSENHANDEL MIT DEN TROPEN 1906–1945

By Fritz Wick. (*Geogr. Helvetica* 3 (1948) 193–264; diagrams)

The commerce of Switzerland with tropical countries, though relatively small, almost doubled in the period reviewed.

ZUR GEOMORPHOLOGIE DES NIEDERSIMMENTALES

By E. Genge. (*Geogr. Helvetica* 3 (1948) 133–42)

LES VALLÉES DE LA ZAPADNA MORAVA, DE LA MORACA ET DE LA TRESKA; étude géographique

By B. Z. Milojević. (*Edns. spec., Soc. Serbe de Géogr.*, no. 26, 1948: 80 pp.; in Serbian; French summary)

## ASIA

BETRACHTUNG ZUR AEROLOGIE DES INDISCHEN MONSUNS

By K. Schneider-Carius. (*Geofisica pura e applicata* 13 (1948) 189–211; diagrams)

REPORT ON THE WEATHER OF THE BORNEO–CELEBES REGION

By C. A. Wood. (*Quart. Journ. R. Meteorol. Soc.* 74 (1948) 144–60)

THE ABORIGINAL TRIBES OF HYDERABAD. Vol. III. The Raj Gonds of Adilabad. Book I: Myth and ritual.

By C. von Fürer-Haimendorf. 10½×7. xviii+450 pp. Maps and illustrations. *London: Macmillan*, 1948. 35*s*

AND GAZELLES LEAPING

By Sudhin N. Ghose. 8×5½. 228 pp. Illustrations. *London: Michael Joseph*, 1949. 12*s* 6*d*

The autobiography of an Indian boy brought up on a rural estate near Calcutta.

LES MU' Ò'NG: géographie humaine et sociologie

By Jeanne Cuisinier. (*Trav. et Mém., Inst. d'Ethnologie*, 45 (1948). xx+618 pp.; maps and illustrations)

These people are scattered over the plateaus of northern Indo-China, mainly in Tonkin, and number about 200,000. They probably share a common origin with the Annamites, but are less advanced, and largely untouched by European influences.

THE AINU PEOPLE OF NORTHERN JAPAN

By I. L. G. Sutherland. (*J. Polynesian Soc.* 57 (1948) 203–26)

THE RAILWAY GEOGRAPHY OF BRITISH MALAYA

By C. A. Fisher. (*Scottish Geogr. Mag.* 64 (1948) 123–35; illustrations)

VILLAGE DEVELOPMENT IN PALESTINE DURING THE BRITISH MANDATE

By H. Kendall. 10×7½. 84 pp. Plans and illustrations. *London: Crown Agents*, 1949. 10*s* 6*d*

THE CLIMATES OF TURKEY ACCORDING TO THORNTHWAITE'S CLASSIFICATIONS

By Sirri Erinç. (*Annals Assocn. Amer. G.* 39 (1949) 26–46; maps)

## AFRICA

AFRICA (Harrap's New Geogr. Series)

By L. S. Suggate. 4th ed. 7½×5. 396 pp. Maps and illustrations. *London: Harrap*, 1949. 8*s* 6*d*

L'ÉROSION DES SOLS DANS LA RÉGION FORESTIÈRE D'AFRIQUE OCCIDENTALE

By R. Schnell. (*Notes africaines, Dakar*, no. 40 (1948) 15–17)

LA VIE ÉCONOMIQUE DE L' A.O.F.

J. Richard-Mollard. (*Information géogr.* 12 (1948) 141–52; diagrams)

VILLES CONGOLAISES: étude de géographie urbaine et sociale

By J. Dresch. (*Rev. de géogr. humaine*, 3 (1948) 3–24; maps and illustrations)

THE USEFUL AND ORNIMENTAL PLANTS IN ZANZIBAR AND PEMBA

By R. O. Williams. 9×6. 498 pp. Illustrations. *Zanzibar: Govt. Printer* (*London: Crown Agents*), 1949. 21*s*

A reference book for native and introduced plants, with cross-references from popular names in English and Swahili.

SOME GEOGRAPHICAL ASPECTS OF THE CAPE FLORA

By R. S. Adamson. (*Trans. R. Soc. S. Africa*, 31 (1948) 437–64)

## AMERICA

THE MISTASSINI TERRITORY OF NORTHERN QUEBEC

By James M. Neilson. (*Canadian Geogr. Mag.* 37 (1948) 145–57; illustrations)

ASÍ ESTA OAXACA

By F. G. de Quevedo. With Eng. trsl. by A. T. Williams. 9×7. 44 pp. Illustrations. *Mexico: Libreria Fout*, 1948. [24*s*]

A sketch of the peoples in this isolated southern state of Mexico, with numerous illustrations.

AVIATION METEOROLOGY OF SOUTH AMERICA

(*Meteorol. Reports, Met. Office*, No. 1 (1948) 50 pp.; maps)

GEOGRAFIA DEL PACIFICO SUDAMERICANO

By Emilio Romero. 9×6. 194 pp. Illustrations. *Mexico: Fondo de Cultura Economica*, 1947. [28*s*]

Deals principally with economics, standard of living, and mutual relations of the countries on the Pacific coast.

ALGUMAS CONTRIBUIÇÕES GEOLOGICAS DOS ESTUDOS DE SOLOS REALIZADOS NO ESTADO DE SÃO PAULO

By José Setzer. (*Rev. Brasil. de Geogr.* 10 (1948) 41–104; diagrams)

ECOLOGIA DE RANCHO GRANDE, UNA SELVA NUBLADA SUBTROPICAL EN EL NORTE DE VENEZUELA

By William Beebe and Jocelyn Crane. (*Bol. Soc. Venezolana de Cienc. Nat.* 73 (1948) 217–58; illustrations)

## AUSTRALASIA & PACIFIC

MAPPING A CONTINENT

By L. Fitzgerald. (*Australian Geogr. Mag.*, Aug. 1948, 8–15; illustrations)

Col. Fitzgerald, Director of Military Survey, describes the progress in the mapping of Australia.

THE LAST OF THE AUSTRALIAN VOLCANOES

By A. V. G. James. (*Australian Geogr. Mag.* Feb. 1949, 10–17; illustrations)

A description of the Mt. Gambier region, South Australia.

THE PHYTOGEOGRAPHY OF SOME IMPORTANT SANDRIDGE DESERTS COMPARED WITH THAT OF THE SIMPSON DESERT

By C. M. Eardley. (Extr. fr. *Trans. R. Soc. Australia* 72 (1948) 30 pp.)

SOME HISTORICAL INFLUENCES ON THE DEVELOPMENT OF THE SOUTH AUSTRALIAN VEGETATION COMMUNITIES AND THEIR BEARING ON CONCEPTS AND CLASSIFICATION IN ECOLOGY

By R. L. Crocker and J. G. Wood. (*Trans. R. Soc. South Australia* 71 (1947) 91–136; maps)

SUBMARINE CANYONS OF THE NEW GUINEA AND SOUTH AUSTRALIAN COASTS

By R. C. Sprigg. (*Trans. R. Soc. South Australia* 71 (1947) 296–310; sketch-maps)

DISCOVERIES IN THE TIMOR SEA, NORTH-WEST AUSTRALIA

By R. W. Fairbridge. (Extr. fr. *J. R. Australian Hist. Soc.* 34 (1948) 193–218; illustrations)

A history of the exploration.

THE OUTLINE OF THE GEOLOGY OF NEW ZEALAND

By Officers of the Geological Survey. 8×5. 48 pp. *Wellington: Geological Survey*, 1948

This pamphlet has been prepared to accompany the Geological Map on the scale of 16 miles to one inch.

## POLAR REGIONS

THE GEOLOGY OF UBEKENDT EJLAND, WEST GREENLAND. Pt. I

By H. I. Drever and P. M. Game. (*Meddel. om Grønland* 134, no. viii (1948). 38 pp.; illustrations)

ANTARCTICA—ONE CONTINENT

By Finn Ronne. (*Explorers Journ.* 26 (1948) no. 3, 1–16; illustrations)

SOUNDINGS TAKEN DURING THE *Discovery* INVESTIGATIONS, 1932–39

By H. F. P. Herdman. (*Discovery Reports* 25 (1948) 39–106; maps)

## GENERAL

MAP PROJECTIONS OF THE ENTIRE SPHERE
By Ronald Miller. (*Scottish Geogr. Mag.* 64 (1948) 112–122. Diagrams)

MEASUREMENT OF GEOGRAPHIC AREA
By M. J. Proudfoot. 11½×9. vi+120 pp. Maps and illustrations. *Washington: Bureau of the Census*, 1946

A study of methods of calculating areas for statistical purposes, prepared in connection with the U.S. Census of 1940.

A METHOD FOR PRODUCING SHADED RELIEF FROM AREAL SLOPE DATA
By A. H. Robinson. (*Surveying and Mapping* 8 (1948) 157–60; diagram)

DIE SCHWEIZERISCHE MITTELSCHULATLAS
By E. Imhof. (*Geogr. Helvetica* 3 (1948) 293–375; maps)

This and two further articles describe the content and methods of presentation of this Atlas, the Jubilee edition of which appeared in 1948. Examples of the plates in colour.

UR- UND NEUOZEANE
By Hans Stille. (Extr. fr. *Abhandlgn. deut. Ak. der Wissens., math.-naturw. Kl.*, 1945–46, no. 6. *Berlin*, 1948; 68 pp., maps)

The author seeks to establish the existence, at the beginning of the Cambrian, of five primeval oceans within the existing world oceans; namely, an "Urpazifik," "Urarktik," and three sections of the present Atlantic, northern, southern and Scandinavian.

AN EXPERIMENTAL STUDY OF SUBMARINE SAND BARS
(*Beach Erosion Board, Techn. Rept.* 3 (1948) 38 pp., diagrams)

TRENDS IN INTER-WAR TRADE AND SHIPPING
By T. Ouren and A. Sømme. (*Skrifter fra Norges Handelshøyskole*, 1948, no. 5; 72 pp.; maps and diagrams)

PRINCIPES ET PROBLÈMES DE GÉOGRAPHIE HUMAINE
By M. A. Lefevre. 9½×6. 204 pp. Maps, diagrams and illustrations. *Bruxelles: Wauthoz*, 1945. [24*s*]

PREHISTORIC MEN
By R. J. Braidwood. (*Chicago Nat. Hist. Mus., Popular ser., Anthrop.* no. 37; 118 pp.; illustrations)

DIE BESITZNAHME DER ERDE DURCH DAS MENSCHENGESCHLECHT: eine anthropogeographische Untersuchung
By W. Volz. 9½×6. viii+206 pp. Maps and illustrations. *Stuttgart: F. Enke*, 1942

DIE ENTSCHLEIERUNG DER ERDE
By W. Behrmann. (*Frankfurter Geogr. Hf.* 17–22. Jhg (1948) 56 pp. maps)

A sketch of the expansion of the world as known to Europeans, with eleven maps for successive periods. The author estimates that in 1500, 22 per cent. of the earth's area was known, in 1600, 49 per cent., and in 1800, 83 per cent.

LES INDICATIONS RELATIVES AUX MARÉES DANS LES ANCIENS LIVRES DE MER
By D. Gernez. (Extr. fr. *Archives internat. d'hist. des Sciences*, no. 7 (1949) 671–691; illustrations)

Discusses methods of setting out tidal data in early navigation manuals.

THE GEOGRAPHY OF POLYBIUS
By F. W. Walbank. (Repr. fr. *Classica et mediaevalia, Copenhagen*, 9 (1948) 155–82)

A discussion of Polybius' "severe and practical" attitude towards geography, which was that of a historian who ignored the advances of contemporary Greek scientists.

TRAVELLER'S JOY
By Eleanor Watkins. 8½×5½. 186 pp. *London: Home and Van Thal*, 1948. 12*s* 6*d*

Sketches of travel in S.E. Asia, New Zealand and South Africa between 1936 and 1945.

## ATLASES AND MAPS

### WORLD

ADMIRALTY CHARTS. 5 New Charts, 6 New Editions, 16 Large Corrections. 4 "Decca" Lattice Charts. *London: Hydrographic Department, Admiralty*, 1949

### EUROPE

EUROPE AND THE NEAR EAST. 1 : 7,500,000. *Washington: National Geographic Society*, 1949

Russian and Polish boundaries according to treaties and claims as of April 1, 1949.

GREAT BRITAIN. 1:625,000. Population Total Changes 1921–1931. 2 sheets; Population Total Changes Scotland 1931–38, England and Wales 1931–39. 2 sheets. *Chessington: Ordnance Survey*, 1948. 5*s. each sheet*

GREAT BRITAIN. Ordnance Survey. Six-inch Map. 56 sheets, *price 2s. per sheet.* Provisional edition on National Sheet Lines. Sheet 51/37 NW., *price 4s.* 1:25,000. 69 sheets, *price 2s. per sheet. Chessington,* 1948–49

GREAT BRITAIN. Administrative Diagrams 1 : 126,720. 6 sheets. *Chessington: Ordnance Survey,* 1949. *Prce 4s. 6d. per sheet*

ENGLAND AND WALES. Stanford's Chart of Selsey Bill to Spithead 1 : 21,000. *London: Edward Stanford Ltd.,* 1949. *12s 6d*

No. 10 of Stanford's coloured charts for coastal navigators.

## ASIA

BURMA. Charts of Rangoon River. Sheets 2 and 3. *Rangoon: Commissioners for the Port of Rangoon,* 1948

## AFRICA

GAMBIA 1 : 50,000. Sheets 20A, 21, 21A. *Teddington: Directorate of Colonial Surveys,* 1948

## AMERICA

AMERICA. Map of the Americas 1 : 5,000,000. 5 sheets. *New York: American Geographical Society,* 1944–48

The five sheets are on a common projection—the bipolar oblique conic conformal, devised by Mr. O. M. Miller (see *Geogr. Rev.* 31 (1941) 100–04). Distances can be measured directly without the error exceeding 4%, and scale departure tables are given for obtaining greater accuracy. Straight lines approximate to great circles. The map is layer coloured; water is blue, railways black, roads and airfield symbols red. City names are graded according to size. A detailed list of authorities accompany each sheet. The three sheets of Hispanic America (first published in 1942) are reduced from the Society's Million Map, with later detail: the two northern sheets are new.

CANADA. National Topographic Series 1 : 63,360. Sheets: 94/A2, 94/A7. *Ottawa: Dept. of Mines and Resources,* 1949

## AUSTRALASIA

NEW ZEALAND. Geological Map. 1 : 1,013,760. 2 sheets. *Wellington: Geological Survey,* 1947

FALKLAND ISLANDS DEPENDENCIES 1 : 500,000 South Shetlands and Graham Land. Sheet F. *Teddington: Directorate of Colonial Surveys,* 1949

Phot. The Times

*Dogs for the Queen Maud Land Expedition in kennels at Telscombe, Sussex*

Phot. The Times

*Grishkin with her litter*

# THE SOCIETY'S NEWS

## THE NORWEGIAN–BRITISH–SWEDISH EXPEDITION TO QUEEN MAUD LAND

Readers will remember that in the *Journal* for October–December 1948 we gave a short account of the preliminary preparations and outline plan for this new international expedition to the Antarctic which has its British headquarters in the Society's House. Since then much has happened. A meeting of representatives at Oslo in April accepted a proposal that an R.A.F. flight of five men, under the command of Squadron-Leader Brian Walford and equipped with two Auster light aircraft, should sail with the Expedition in November, returning with the ship the following year. The ship itself, a Norwegian sealer of about 700 tons, is now being built at Flensburg. And the dogs, thirty or more, have arrived from the Falkland Islands Dependencies as a present to the Expedition from the Governor. They are housed in kennels in the village of Telscombe on the South Downs, a constant source of curiosity to tourists from Newhaven and Brighton. It has now been arranged that the sledge dogs as well as three amphibious tracked vehicles and other heavy gear will be carried across to Norway early in October and leave for the south on board a whaling factory ship from which they will be transferred to the Expedition's ship, the *Norsel*, in Antarctic waters.

The four British members of the wintering party, who will stay down in Queen Maud Land continuously until February 1952, have also been chosen. Mr. G. de F. Robin, physicist and lecturer in Physics at Birmingham University, is an Australian from Melbourne and was formerly a member of the staff of the Falkland Islands Dependencies Survey. Mr. Alan Reece, second geologist, who has just taken his degree at the Imperial College of Science and Technology, has also had considerable Antarctic experience with the same expedition. Then there is Dr. E. F. Roots, senior geologist, from Canada who has been attached to the Canadian Geological Survey and has just completed a research course at Princeton, U.S.A. The fourth British member of the wintering party is Mr. Charles Swithinbank, geographer and glaciologist, who was a member of the Oxford University Exploration Club's post-war expeditions to Iceland and to Gambia Colony.

One of the most important tasks of the Base party will be to study the physical properties of the inland ice, of high polar type, both by means of temperature recordings at depths down to about 100 metres over a long period, and by drilling, if possible, a core of about 150 metres for the study of crystallographic structure. For this purpose a boring machine from the Canadian Longyear Company has been bought by the Expedition through a generous grant from the Rockefeller Foundation and experiments are being carried out in Norway and in Sweden in which Mr. Robin and Mr. Swithinbank are both taking part.

Meanwhile, at the R.G.S. and at the headquarters of the R.A.F. "Antarctic Flight" at Hendon, equipment of all kinds is being collected together in the three months or so remaining before the *Norsel* arrives at a south coast port to pick up the British party. Cooperation from Government Departments and from private firms has been generous and private firms especially have been most helpful in their readiness to adapt, or even invent, equipment for Antarctic use. British equipment will, in fact, play a large part in the fitting out of the expedition; it includes sledges of a new design with plastic running surfaces, extra

light weight sledging rations, tents and clothing of special wind-proof cloth, all the woollen clothes (supplied by the firm that supplied Scott and Shackleton), pressure cookers, nylon rope, generating plant, radio and meteorological equipment and a mass of other items essential for the equipment of a modern Polar expedition.

## THE COLONIAL MONTH

In connection with the "Colonial Month" held in London during June and July, a small exhibition of maps was displayed in the Ambulatory, with the title "Maps for Colonial development." This was organized with the close cooperation of Brigadier M. Hotine, Director of Colonial Surveys, and the main purpose was to show the present activities of the Directorate. As far as possible the latest topographical surveys for each colonial territory were displayed: sheets exhibited included the pilot sheet of the new topographical series (1/62,500) of Kenya; the Falkland Islands and Dependencies, 1/500,000, with progress chart; British Honduras and Gambia, both on the scale of 1/50,000; and the Volta River Area, 1/5000. These were supplemented by geological, soil, population, and other distribution maps including some from recent reports published by the Colonial Office, and field sheets of the land use survey made by the Oxford University Expedition to the Gambia. The Directorate of Colonial Surveys lent a number of air photographs of typical landscapes, and original maps by Livingstone, Speke and other African explorers from the Society's collection were also shown. The Exhibition was visited on July 28 by the Rt. Hon. the Earl of Listowel, Minister of State for the Colonies.

## HONOURS FOR MEMBERS OF COUNCIL

The nomination by H.M. the King of the Rev. W. L. S. Fleming for appointment to the Bishopric of Portsmouth and the appointment of Air Chief Marshal Sir John Slessor to the post of Chief of the Air Staff in succession to Lord Tedder have brought new distinction to the Council of the Society. Mr. Fleming, Dean and Chaplain of Trinity Hall, Cambridge, and Director of the Scott Polar Research Institute of the University, has been an active member of the Council since 1947, and of the Joint Polar Research Committee. He has also taken a large part in the organization and planning of the Norwegian–British–Swedish Expedition to Queen Maud Land as a member of the joint organizing committee of the Society and of the Polar Institute.

Air Chief Marshal Sir John Slessor has been a member of the Council since 1946 and was elected a Vice-President of the Society at the last Annual General Meeting. Sir John Slessor has also been a member of the Joint Polar Research Committee and of the organizing committee for the Norwegian–British–Swedish Antarctic Expedition in which R.A.F. participation has been arranged, largely through his efforts and enthusiastic support. Air Chief Marshal Sir John Slessor has also for two years been a Vice-President of the Institute of Navigation which is established in the Society's House.

## WATKINS AWARD

The Watkins award for 1949, a sum of £50, has been awarded to Mr. W. B. Harland, Lecturer in Geology in the University of Cambridge and leader of the Cambridge Spitsbergen Expedition, 1949. A grant of £20 has also been made to Mr. J. M. Hartog of Christ Church, Oxford, leader of the Oxford University Expedition to North-East Land, 1949

The fund is administered for the Scott Polar Research Institute by a committee appointed by this society and Martin's Bank Limited, the joint Trustees of the Fund (see this *Journal* 109 (1948) 137).

# THE RECORD

## THE ELEVENTH CENSUS OF MALTA

The Eleventh Census of the Maltese Islands, taken on 14 June 1948, completes a series which spans a period of a hundred and six years. The taking of this particular census was a departure from the usual practice of decennial periods, the reason being the change from Crown Colony status to Self-Government. The new Administration required detailed figures to help solve such urgent problems as reconstruction, housing, social services, and especially taxation, for Income Tax has been payable only since 1 January 1949.

The total population of the Maltese Islands on the night of 14 June 1949 was 305,991. The totals for the three islands were as follows: Malta 278,311, Gozo 27,612, and Comino 68; the islets of Cominotto and Filfla are uninhabited. In 1842 the population numbered 100,200, so that in a hundred years it has more than tripled itself. In the words of the Chief Census Officer "if the conditions governing the natural increase of population which have prevailed during the decade 1931–1941 are in future maintained, the population should reach the half-million mark in 1971." The density of population for Malta is now 2511 per square mile; it was 1610 per square mile in 1901. This startling increase of population, for a land which possesses practically no natural resources, has been brought about by a continuous high birth rate—one of the highest in the world—and a steady fall in infantile mortality which, although still high, is being rapidly reduced; there has also been very little emigration in the past ten years. The density of population in Malta is probably the highest in Europe, though comparable figures would be found in the Far East where Singapore has a density of 2400 per square mile. The population is still growing rapidly, for there is an annual net increase of more than 7000. The density of population is especially high in the areas classified as suburban, the effect of the war being to speed up a movement from urban to suburban areas, which had started at the beginning of the present century: 12 per cent. of the population is classified as urban, 52·56 per cent. suburban, and 34·81 per cent. as rural. Unlike rural areas in other parts of Europe, which in so many cases have registered a decline in numbers in the past thirty years, every one of the villages in Malta registers an increase; but the term "village" is perhaps a misnomer, for such centres as Zeitun and Zebbug, with populations of 12,000 and 7000 respectively, would be dignified with the name of town in other countries. In Malta this appellation is reserved exclusively for Valletta.

The population of Malta is a young one, for no less than 75 per cent. of all the people are less than forty-three years old. The marriage rate too was higher in 1948 than at any other previous census, reflecting an improvement in the social and economic condition of the people consequent on the war. Money flowed freely into the islands, large bodies of British and American troops used them as an important base and, besides the sums paid then for services rendered, British War Damage payments are a notable source of the present-day revenue. As might be expected from such a rapidly increasing population, families are large, 10 per cent. of all families consist of six persons and 2·75 per cent. of ten persons or more.

A novel feature of the 1948 census was the compilation of careful figures on literacy and standards of education. Six different standards were recognized: 1, Infant stage; 2, Primary; 3, Secondary; 4, Practical Training; 5, Post Matric.; 6, Professional. Of the male population 4·1 per cent. was classified as

being of "Post Matric." standard and of the female population 2·9 per cent. Of the male population, 2·8 per cent. reached the Professional standard, but of the female only 0·5 per cent. It may be remarked that Malta possesses the oldest University in the British Commonwealth, and this Royal University has been of great help in maintaining professional standards. Figures also show that mass illiteracy is sharply declining. In 1948, 35 per cent. of the population was classified as illiterate which, for the purpose of the census, was defined as inability to write and to read the simplest forms of prose in any language. In 1911, the figure for illiteracy was no less than 75 per cent. Education, which became compulsory for all children between the ages of six and fourteen in 1946, should speedily lower the present figure for illiteracy, and adult classes, organized for illiterates by the Education Department, are very popular. No figures were taken at this census on the languages spoken by the population, but it is certain that the English language has made great advances in the past ten years, although the standard of spoken English needs improvement.

With regard to occupations, only 13 per cent. of the population was classified as farmers or fishermen; 18 per cent. was engaged in transport and communications and 39 per cent. in "personal and other services," a vague term which must include many who are occupied with the three Services, or who work in the Royal Dockyard. Of wage earners, 60 per cent. earned between 60*s* and 100*s* during the week ending May 29. This may surprise those who knew Malta before 1939, when wages as well as the cost of living were lower than in most places in Europe. Unemployment in the same week was extremely low; in fact, it has been low since 1940. There were but 1331 wage earners who were unemployed during the week ending 29 May 1948, and of these less than 300 had been totally unemployed during 1947.

There is much overcrowding in the island; 17 per cent. of all households had no bedrooms, and of these 3 per cent. were large households of from ten to fourteen persons, 74 per cent. of all households enumerated were living in dwellings with one to three habitable rooms (including bedrooms).

The census of 1948 reflects present and future problems. Owing to the huge increase in population it is very doubtful whether there will be sufficient regular employment in the future, especially when funds provided for making good war damage are exhausted. Emigration is therefore a necessity, and in fact about 40,000 people have signified their wish to start life anew overseas. The tide of emigration which was running swiftly in the 'twenties and early 'thirties of the present century has hardly started to flow again because of the lack of shipping facilities. With this expanding population, the water supply too has given rise to some anxiety for the rainfall of Malta is uncertain. It was less than 10 inches between September 1947 and the following September, and in 1948 and in some other years water was imported by tanker from Sicily. The vigorous Maltese race, with its abundant man power, should be able to plant colonies like some of its ancestors, the Phoenicians of old. But these colonies, unlike those of Phoenicia, will have to be placed much farther afield than the Mediterranean littoral.

The census report is published by the Government Printing Office, Valetta, price 15*s*. E. C. B.

## THE FRENCH EXPEDITION IN GREENLAND

The following message was received on July 25 from M. Paul-Emile Victor, leader of the expedition:

"From location future central Greenland ice-cap research station 70° 54′ N. 40° 42′ E. same as Wegener Eismitte 1931 attained by us 17 July 1949

at 12.00 h. with five weasels twenty men and equipment send you best regards."

This expedition, one of three sent out last year by the *Expéditions Polaires Françaises* organization, spent the summer of 1948 in assembling at the edge of the inland ice near Disko Island the modern equipment and extensive mechanical transport on which its three-year programme is based. There are three parties; the party alluded to in this message which, reoccupying Wegener's famous station, will make meteorological and geophysical observations at the centre of the ice-cap; a mobile party which is to recross the ice-cap along several lines and make gravimetric, geodetic and glaciological investigations; and a coastal party to study glaciology and geology. The ice-cap parties are to be supplied by parachute and are otherwise dependent on "weasels" (tracked snow vehicles).

Eismitte was the central station occupied during the winter of 1930–31, in the face of almost incredible hardships, by Georgi, Sorge and Loewe of the ill-fated German Greenland Expedition led by Alfred Wegener (see this *Journal* 84 (1934) 515–22).

## DESTRUCTION OF THE LIVINGSTONE MEMORIAL AT CHITAMBO

News was received in June of the destruction of the memorial at Chitambo which marks the scene of David Livingstone's death and the place where his heart was buried by his loyal servants before they carried his body to the coast and brought it back to England. It is of interest to recall that the body lay for two days in state in the Map Room at the Society's old house in Savile Row, the subject of our Christmas card this year, where the public filed past it in tribute to the memory of this unexampled traveller.

It appears that a native, who was later arrested and found to be insane, had demolished the upper part of the brick and cement obelisk and the cross surmounting it, destroyed the four small pillars at the corners of the monument, and damaged a number of trees planted nearby. This memorial was set up by the Royal Geographical Society in 1902 and is described and illustrated in the *Journal* for April 1903 (21 (1903) 454–5). A new monument is to be erected by the Northern Rhodesia Commission for the Preservation of Natural and Historical Monuments and Relics. A part of the tree beneath which the heart was buried is in the Society's Museum and bears the inscription made by Livingstone's servants.

The monument now destroyed is not the one at Ujiji, marking the scene of Livingstone's meeting with Stanley, which was recently rebuilt in granite and is described and illustrated in the *Journal* (109 (1947) 141).

## UNIVERSITY NEWS

### UNIVERSITY OF DUBLIN (Trinity College)

The main item of news is the construction of a new Geography Department within the Museum Building at a cost of £6000, which will be ready for occupation in the autumn. The old Drawing School used by engineering students, a large and lofty room, has been adapted for the needs of geography by building new walls and by dividing part of the space into two separate floors, with the result that the new department will include a lecture room seating seventy, a map room for twenty, and a room for the honours students in which part of the library and map collection will be housed. There is ample provision for drawing and also for the storage of equipment; there are staff rooms, a research room and an attendant's rooms on the quiet upper floors. The new department is not

a separate structure, but has the quality of a modern maisonette with twentieth-century lighting and seating, in the inconvenient if architecturally famed Museum Building. The separation from Geology is now complete, but the two departments will remain near and friendly neighbours: the very existence of Geography in Dublin has been made possible by the courteous hospitality of the Geology department for many years. Incidentally, the geologists will now benefit by the removal of the geographers to new quarters.

Humanity flows through the classes and laboratories in ever-increasing numbers though the standard of achievement is not at present conspicuously high: approximately one-tenth of the University's 2500 students take some course in Geography. There have been a number of visitors during the past year, including several American research students, two of whom have chosen the Northern Ireland border for their subject of study. In April 1949 the staff and students welcomed Professor W. Fitzgerald, Mr. N. Pye, and a party from Manchester for a week's fieldwork in Co. Wicklow: the sun shone perpetually but a heat haze hid the famous smoothly moulded hill-line of the Wicklow Mountains. During a cold spell in May, Mr. E. W. Gilbert came as a visiting lecturer to the Department and spoke on "The idea of the region" to an audience delighted by his wit and eloquence; a lively discussion followed. The staff are closely associated with the work of the Geographical Society of Ireland, and are responsible for the management of the annual fieldweeks, of which that in 1949 is to be held at Roscommon. Finally, the Barrington lectureship for the Connacht province, which is given by the Statistical and Social Inquiry Society of Ireland, was this year given to a geographer for the first time since its inception in 1836: the writer of this note lectured in Co. Galway and Co. Mayo on such subjects as emigration, Irish farming and Irish country towns. The geographical torch was carried as far as Belmullet, on the Atlantic shore, and to a remote parish hall in the mountains of Mayo, where the audience of over two hundred people was drawn from a radius of ten miles. T. W. F

## WHITBECK FELLOWSHIPS IN GEOGRAPHY

One of the two Whitbeck Fellowships in Geography at the University of Wisconsin for the year 1949–50 has been awarded to Mr. D. J. King of the Geography Department of the University of Leeds. The fellowships, which carry a stipend of $1000, are intended to meet the cost of a year's residence in the university and are open to men and women graduates who have completed the equivalent of an ordinary four-year undergraduate course in America. The next award will probably be made in the spring of 1950 and we hope to publish particulars later.

## AN INTERNATIONAL BIBLIOGRAPHY OF CARTOGRAPHY

As Professor Em. de Martonne remarks, it is a little surprising at first sight that up to the present there has been no international list of the current production of maps and atlases. The variety of the material and the widely scattered and often discontinuous manner of its publication have made it difficult to keep abreast of the output, at least of maps other than those issued by the national surveys. No comprehensive national list was available until a group of French geographers undertook the publication of a 'Bibliographie cartographique française' for 1937. This initiative was approved by the International Geographical Congress at Amsterdam in 1938, and the hope expressed that it might become international in character. The French lists were brought down to 1945, and now, with the support of the Union and the French National Committee for Geography, the first advance towards an international publication has been

made. The 'Bibliographie cartographique internationale 1946–47' (Paris: Armand Colin, 500 francs) is edited by Mlle. M. Foncin, Conservateur du Département des Cartes at the Bibliothèque Nationale, and Mme. P. Sommer, Librarian of the Institut de Géographie, with the help of several collaborators. It covers maps, atlases and globes published in France, Belgium, the Netherlands, Denmark, Sweden, Finland, Switzerland and Portugal. The main division is by political units with the subdivisions—general surveys, special maps and regional maps and plans. New editions of existing series are included, and in many cases analytical notes are added. Mlle. Foncin and Mme. Sommer have established the work on a sound basis, and taken the first step, in difficult circumstances, to enlarge its scope. It is much to be hoped that it will eventually become truly international, and especially that British work will be adequately represented. In view of the current demand for maps, it would also be convenient if arrangements could be made to publish the British section separately in an English edition. Though it may be necessary to reconsider minor details, particularly with a view to keeping the annual volume to a reasonable size, the present volume must serve as a model for the future. G. R. C.

## A GERMAN GEOGRAPHICAL HANDBOOK

The "Amtes für Landeskunde" at present established at Landshut, Bavaria, has recently begun an annual publication with the title *Geographisches Taschenbuch*, which contains much information on the organization of geography in Germany. The Amt, an independent organization in the Bavarian Government, works in association with the "Zentralausschutz für Deutsche Landeskunde," the successor of the former Zentralkommission. The work is edited by Dr. E. Meynen, the Director of the Amt, which is mainly concerned with regional studies, maps and planning in Germany. The *Taschenbuch* however deals with the organization of geographical research and education as a whole, and contains lists of personnel in the geographical departments of the Universities and High Schools, and public departments such as the geological survey, meteorological service and planning authorities.

The second part is of a more general character, being designed to help those engaged in regional studies, geographers, sociologists, historians, etc. There are sections on the methods and aims of regional survey, cartographical technique and field work, accompanied by bibliographical references to the literature in German. The general statistical information includes the results of the census of 1946 for Gemeinde of more than 20,000 inhabitants. A great deal of information in fact is given in a compact form.

## THE *JOURNAL OF AFRICAN ADMINISTRATION*

We have received the first two issues of the new *Journal of African Administration*, published by His Majesty's Stationery Office for the Secretary of State for the Colonies. The aims of the Journal include the recording of developments, experiments and practical experience; the discussion of current problems both by administrators and by other competent observers; and the provision of a link between administration and research. It absorbs the former typewritten publication, *Digest of African Local Administration*.

These two issues contain a number of articles on local administrative bodies in the African Territories and two articles comparing such bodies in Africa with the local government systems of England and Germany. An interesting paper by K. L. Little, "The Organisation of communal farms in the Gambia", describes the success of a project based, not on the usual pattern of the co-operative society, but on the traditional *Kaffu* system of village organization by

age groups or "young men's clubs." A cash crop of ground nuts is grown by the *Kaffu* of each village in its spare time and the joint proceeds of the enterprise are used to purchase food for distribution during the annual period of dearth.

An unusual and valuable feature of the Journal is the review of current legislative Ordinances, which is to appear in each issue. The Journal is issued quarterly, price 1*s* 6*d*. Annual subscription 6*s* 6*d* including postage.

## INFORMATION ON THE COMMONWEALTH

Inquiries are frequently made of the Society, by students and others, for information on Commonwealth countries and we have recently obtained pamphlets from the Imperial Institute and the Ministry of Education setting out the facilities that they offer in this matter.

The Imperial Institute (London, S.W.7) provides film strips, lantern slides, photographs, maps, wall charts and leaflets. A limited supply of specimens of economic products is available for school museums. Lists may be obtained from the General Secretary. The Institution's exhibition galleries and cinema are open daily without charge to school parties and others. Circular 187 issued by the Ministry of Education, to universities, schools and education authorities, deals with similar material which may be purchased from His Majesty's Stationery Office. The Stationery Office catalogue 'Britain and the Colonies' (price 3*d*.) should be obtained for futher details.

The "Information Papers" issued from time to time by the Empire Information Bureau of the Royal Empire Society are intended for those who contemplate residence in overseas territories; No. 18, on conditions in North Borneo has just been received.

# OBITUARY

## C. C. CARTER

Cyril Carter died on February 15. For thirty years he taught Geography at Marlborough, then for seven more years at Oxford. But his influence spread beyond these fields; for he was a director of Board of Education refresher courses, founder of the Public Schools' Geography Committee, and at one time Chairman of the Geographical Association; and he was the author of numerous articles and books.

When Carter started at Marlborough, Geography found but little place in the curriculum; before he left, the subject had become a distinctive feature of the school. And the teaching was not merely by a few specialists but by a team of nine or ten volunteers all deriving inspiration and guidance from "C. C. C." The walls of Jericho had crumbled to enthusiasm and gentle persuasion. For Carter, Geography was concerned essentially with the activity of Man. The Geography of the Southern States was primarily the study of the living conditions of the negro, not the accumulation of statistics on exports of cotton. Yet he was by no means unmindful of the physical and economic factors, as his writings all show; and he regarded the concept of natural regions as a solid contribution to the study of Human as well as Physical Geography—providing it was used intelligently. "Tools to handle complexity, good servants, bad masters" is a pencil note I find in the margin of one of his papers on Herbertson's Regions. And in talking of oil in Mesopotamia he makes the same point. "This (said

Allah) . . . is Iraq, I know it. . . . It is just as it left my hand. The Iraqis have done nothing with all the treasures I put there, nor used all the secrets I cunningly hid there." It is the "possibilism" of Febvre or the Human Geography of Brunhes or Fleure. The emphasis is still on Man. In adapting Human Geography to the needs of teaching, Carter was anxious that it should never become superficial and vague. He conceived two methods of preventing this: a 'Geographical Grammar' to provide a discipline to geographers as salutary as that enjoyed by the classics, and the intimate study of small regions. As a practical expression of the latter he wrote with a colleague 'The Marlborough Country'. Later he produced 'Landforms and Life' a series of studies based on large-scale maps of small regions in other parts of Britain and beyond. For many people this book is Carter's most valuable contribution to the teaching of Geography.

Carter was an outstanding schoolmaster because, in addition to his enthusiasm for his own subject, he was a man of modesty, courtesy, and rigid integrity. He imposed on himself a strict code of behaviour, yet he was tolerant to others and seldom spoke of any with unkindness. To many of those who came under his influence he set standards which have left a deep impression on their lives.

E. C. M.

## PHILIP LAKE

Philip Lake was born at Morpeth in Northumberland and died at Cambridge on Sunday June 12, after a severe operation, at the age of eighty-four. After a time at the Newcastle College of Science where he studied geology under Professor Lebour, he matriculated at St. John's College in 1884 as a Foundation Scholar and was later placed in the First Class of both parts of the Natural Sciences Tripos. He specialized in Geology in his student days, and shortly after taking his degree he joined the Geological Survey of India, but had to retire on account of his health after three years. He then returned to Cambridge. After a few years he was appointed a lecturer in the infant department of Geography.

Later he became Reader and Head of the Department and it was largely through his efforts and those of Stanley Gardiner that the Geographical Tripos was founded—the first Part One being held in 1920. He remained Reader until 1928, when he retired somewhat before he had reached the full tenure of his office. During that time Geography made great strides in Cambridge and it was Lake who based it on sound foundations. In his work he was accurate, clear thinking, and lucid. He had the gift of writing with clarity and simplicity and anyone who has studied his books or papers will know that ease of reading did not necessarily imply equal facility in remembering what was so clearly expressed.

As a teacher he was excellent. He had a quiet sense of humour and a marked ability to present his material aptly. Moreover, his own scholarship was high and he always succeeded in making those who knew him well eager to follow his lead. It was, however, the experience of many of his students that the simplicity of his explanations of a difficult subject was the result of wide learning in other branches of science and in mathematics and was not easily emulated! His lectures were interesting and informative and were always highly valued. On the other hand on more informal occasions he could make a happy and witty speech, and in the early days of the Geographical Club he was always called upon to do so at the Annual Dinner.

Throughout his long life Lake never lost his interest in Geology, and for

many years after his retirement much of his time was spent in preparing several volumes on the Trilobites for the Palaeontological Society. These he illustrated himself—and he was a remarkably clever artist both in black and white and in pastel. He was also a keen chess player.

After his retirement Lake lived very quietly and for some years walked to and from the Sedgwick Museum daily. In later years he moved to a more distant part of the town and gradually became a less frequent visitor to the Museum, especially after he had a bad fall on a museum staircase.

He was unmarried and outlived all his family, so that in his last years he seemed somewhat lonely. But he maintained his interests, and his friends saw him from time to time and always found him cheerful. To those who knew him well he will be remembered as a most friendly and kind man, if rather shy, who was a good scholar and a first-rate teacher. J. A. S.

## LIEUTENANT-COLONEL SIR HENRY LIONEL GALWAY, K.C.M.G., D.S.O.

Sir Henry Galway died on 17 June 1949 at the age of eighty-nine. Entering the army in 1878 as an ensign in the 58th Foot, he devoted the greater part of a very active life to colonial administration. From 1882 to 1889 he was A.D.C. and Private Secretary to his father, the Governor of Bermuda, and in 1891 he was appointed a Deputy Commissioner and Vice-Consul in the Oil Rivers Protectorate, as Southern Nigeria, administered by the Foreign Office, was then known. He continued to serve in West Africa until his appointment as Governor of St. Helena in 1902 and he was successively Governor of the Gambia and Governor of South Australia.

Sir Henry had been a life Fellow of the Society since 1892 and read a paper on "Journeys in the Benin country" in that year (*Geogr. J.* 1 (1893) 122). He served on the Council from 1922 to 1926.

# CORRESPONDENCE

## GEOGRAPHY AND LITERATURE

Although there is much good literature available which is concerned with travel and exploration and a sufficiency of academic papers and articles written by specialists for professional geographers, there is a dearth in Britain of really good books on important aspects of geography *related to life* which every educated person could read with pleasure and profit. Books are urgently needed which deal with the geographical aspects of some of the pressing political and economic problems of to-day. Books, that is to say, which could inform the statesman, the soldier, the administrator and the ordinary voter about the world in which they live and about those who, under different circumstances, live in it with them; books which could convince the doubting man-in-the-street that geographers have something to offer and can do more for mankind than teach people to teach other people to teach a kind of geography which can interest and benefit few people outside the academic sphere.

Curiously enough many British academic geographers seem to be apathetic about this sorry state of affairs. "What does it matter?" some of them say. "Geography is an academic subject and as such need only be intelligible to those professionally concerned with it." That the general public knows little and cares less about their objects or their work seems to give little or no anxiety to these people, who seem to prefer to pursue their studies in the guarded privacy of a university back room and, unlike certain other "back room boys," to care very little whether anything of real use to mankind comes out of that secluded retreat.

Chemistry, physics, zoology, astronomy and biology are also academic studies, but these sciences are very much alive to the value of public interest and every year books and articles are written (with the minimum of technicality) for the information and interest of the educated layman. These subjects have more excuse for the employment of a terminology than has geography yet it has been found quite possible to write about them in ordinary language. Art and music are also highly specialized studies, each of which employs a terminology of its own, but every effort is made to help the public to understand both of them and to realize that these arts are important factors in everyday life. Only the medical fraternity, the psychologists and the geographers seem anxious to veil their knowledge and their doings and to take up the attitude that the things with which they are concerned are far too abstruse to be comprehended by the ordinary mind. The medicine-men have at least one good excuse for making their literature incomprehensible to all save practitioners, and the psychologists are prone to borrow it. That excuse is, of course, that a little knowledge of their subject may prove to be very dangerous to laymen. The geographers however cannot employ that excuse. It could and would be very good for laymen to know a great deal more of what the geographer knows than is made possible at present.

As things are, there is little available to acquaint ordinary folk with geography. They remember (many with repugnance) that they spent weary hours at school learning a lot of alleged facts about people, places and things but few of them can remember being taught how those facts helped to produce the conditions under which they lived or were factors in the problems of the world of their youth. They read next to nothing to-day which is likely to convince them that geography is anything more than one of those things one learns in school and forgets in life!

This prevailing ignorance and apathy will, of course, be made worse by the present efforts of some professional geographers to invent a terminology for the subject which will ensure that no one other than professional geographers (or those trained in university schools of geography) will be able to read and understand any serious geographical work. One suspects that, by encouraging —nay demanding—the use of a professional terminology and by pouring contempt on anything geographical not expressed in that terminology, this group of academic geographers hope to advance towards their second objective which is to restrict geography to a narrow and pedantic conception and to frown upon its development as a social study and upon its practical application. If these earnest but misguided persons are allowed to succeed in either of these things they will, at one and the same time, check the natural and proper development of geography, severely limit its usefulness and postpone indefinitely the day when British geography can boast of a literature the equal of that which is the ornament of France.

Geography does not need to invent new words. The words which were good enough for Herbertson and Mackinder are good enough (sometimes too good) for present-day British geographers. Nor does geography need to withdraw

from its outposts as does an empire when its knell is sounding. Rather does geography need to prove itself as a factor in the life and affairs of men and to produce a readable literature through which it may educate and interest those ordinary people by whom most things are done or made possible and upon whom, in the last analysis, everything depends. E. O. GIFFARD

1 *July* 1949.

## THE CZECH-ENGLISH DICTIONARY OF GEOGRAPHICAL TERMS

The review of my 'Geographic terminological dictionary: Czech-English' by "M.A." in your *Geographical Journal* has surprised me very much. From the high standard of your *Journal*, as well as from the courtesy which usually distinguishes British geographers, I had hoped that a review in your *Journal* would have provided helpful, expert criticism. Instead I find that the review is written by a man who takes *e.g.* "ice rain" "ice storm" to be synonymous with "hail," which needless to say it is not, at any rate as a technical geographical term (see Finch and Trewartha, 'Elements of geography'), and who imagines that "cirque" can be substituted for "amphitheatre of moraine"; again here the two terms refer to two distinct geographical phenomena; personally I venture to think that "amphitheatre of moraine" is at least as descriptive as, and certainly shorter than, "tongue-basin with moraine walls," used by M. R. Shackleton in her 'Europe, a regional geography.' Unfortunately, I lost my large material for the making of the dictionary during the German occupation of my country, so I am unable to give "M.A." chapter and verse for every term used, but I can assure your readers that most of my English terms are taken from British geographical textbooks, the remaining ones from American textbooks. It seems wasteful and somewhat discourteous to the American geographical world to refuse to use in English the terms created by them, now when they are so amply repaying the debt they owe their English predecessors. Though I have not in any single case depended on a dictionary for my English terms, I may perhaps point out that words like "beton," "brunet" or "brunette," "pirogue," "perron," "nog," "montanic," "montigenous," "drift-way," "indigene," etc. will be found in any good English dictionary, without any "obs." appended to them, as indeed they belong to current geographical language.

With regard to the Czech words, it is regrettable that "M.A." has not realized that *bor* and *borek* are *topical names* and are used as topical names on our Staff maps on the scale of 1:75,000; perhaps "M.A." has been misled by 'Notes on G.S.G.S. maps of Germany, Denmark and Central Europe' (March, 1944), which in its "Short glossary of Czech and Slovak" gives every word printed on the map with translation, not only *bor* (=Bor) and *borek* (=Borek), but also, for example, *krkonoše* (=Krkonoše) as "high mountain ridge"!—it is of course the Czech name for the German Riesengebirge (English: Giant's Mountains)—*nebozízek* (=Nebozízek) as "borer"! or *týn* (=Týn) as "fortified place, enclosure," which again it is not; it is used exclusively as a proper name, alone or in compound words: *Karlův Týn* (=Charlestown, Karlstein in German), *cf.* Grahamstown, Newtown, etc. As a mere foreigner I do not venture to enter into the controversy of the purity of the English language, but as a Czech I must strongly protest against the statement that "if expressions like *domek weekendový* (for week-end cottage) are really acceptable in Czech, the possibilities for corrupting the language through loan-words are grotesque," as it is indeed a current term in Czech.

Finally, I may perhaps say that the tradition of work and courtesy hitherto existing among British geographers had led me to hope that now one, now another, would build on the pioneer work offered them by my dictionary. If this tradition has really been broken, it will be a cause for regret to many foreign geographers and a betrayal of a great tradition. I may add that I believe that this tradition still exists.

JIŘÍ KRÁL

*Prague, 14 June 1949*

Dr. Král has mistaken the severity of my review (*Geogr. J.* 112 (1948) 229) for a discourtesy which was never intended. Perhaps he has not understood the fundamental objection which I raised, and sustain, to certain aspects of his work, one of which is expressed by the title of his book. 'Geographic terminological dictionary' is not good English. The word geographic is American and its combination with terminological is jargon. "Dictionary of geographical terms" would be good English in the sense in which His Majesty's Government is trying to foster the use of the language through Sir Ernest Gowers' book 'Plain Words, a guide to the use of English' (H.M. Stationery Office, London, 1948).

That words like beton, brunet, pirogue, perron, nog, montanic, montigenous, drift-way, indigene, "belong to current geographical language," I deny. Nor do they occur in "any good English dictionary without any 'obs.' (obsolete) appended to them." True, most of them are in the best of all English dictionaries, 'A New English Dictionary on Historical Principles' (Oxford, 1888–1928, supplement 1933), where montigenous is marked *rare* and montanic *obs. rare*. Most of the others are of foreign origin, and of specialized, technical application if used in English. There are three kinds of drift-ways, pastoral, nautical and mining. Most English seamen now prefer leeway; and in the pastoral sense the expression seems to have died out in England. In British countries overseas cattle-track and stock-route are now preferred.

I do not take ice rain to be synonymous with hail, and I did not mention ice storm. Confronted by Dr. Král with ice rain, I merely wondered what he meant and supposed that he must have meant hail. Ice rain and ice storm are terms which have not been admitted into 'The Meteorological Glossary' of the Air Ministry (H.M. Stationery Office, London, 1944). There is a highly specialized meteorological expression in English, "frozen rain," which corresponds to the word "sleet" in American meteorological usage. This, presumably, is what Dr. Král means by ice rain. Similarly with "amphitheatre of moraine," which I did not understand. I supposed that it must mean cirque. Miss Shackleton's "tongue-basin with moraine walls" however is clear and precise, and is good English. Is it possible that Dr. Král has coined the ambiguous expression "amphitheatre of moraine" for us?

I regret to hear that *weekendový* is well established in Czech, which I have always understood to be a rich and flexible language. The word affects me in the same way as the Spanish *futbol* (football) or the French use of *le dancing*. We have our monstrous words in English, but good writers do not use them. A word is not necessarily a good word because it is current or because it appears in dictionaries. Nor is there any reason why English geographers should adopt American terms if they can get on quite well without them. They have never hesitated to adopt foreign terms which they find necessary and have no prejudice against American terms in particular. But the divergence between the several branches of English is in places wide. Those who wish to understand the complex body of modern speech which is called English will find H. L.

Mencken's book 'The American Language' (4th ed., New York, 1936, suppts 1945 and 1948) of great value in discriminating between English and American usage. Educated Americans and Englishmen, engaged in discussion together, are now keenly aware of the need for discrimination if misunderstanding is to be avoided. No Englishman talks naturally of the faucet, the sidewalk, the door yard, or a hank of yarn. He calls them the tap, the pavement, the front garden (or lawn) and a skein of wool. American English has diverged from the speech of England nearly as far as American Spanish and Brazilian Portuguese have diverged from the parent tongues.

Through the PCGN lists of names in Czechoslovakia British geographers have long been familiar with the Czech names of such features as the Riesengebirge. Those elements which appear several times, or repeatedly, in foreign place-names are both of geographical and of historical interest, and it is to be hoped that British glossaries to foreign maps will continue to explain them.

M. A.

8 *July* 1949

## THE SOCIETY'S CHRISTMAS CARD, 1948

I thought you might be interested in two incidents concerning the epic of H.M.S. *Investigator* in 1851, both of which have come to my notice as a result of the Society's Christmas card of 1948.

One recipient, Colonel Bedford Pim, who hails from a family of sailors, has related to me that his father, then a lieutenant in H.M.S. *Resolute*, when on a sledge journey from that ship, found H.M.S. *Investigator* bound in the ice and rescued the crew. The finding was the subject of a picture in the academy of 1853 or thereabouts showing the ship on an even keel. The second link is provided by a Parsee gentleman, Professor A. S. Wadia, the traveller and author, who in a recent letter tells me that H.M.S. *Investigator* was one of the naval vessels built by his great grandfather when his family had shipbuilding interests in Bombay. He adds, he is sure it must have stood the buffeting of the ice near Baring Island just as H.M.S. *Salsette* stood up to all the buffeting in the Baltic Sea for nine weeks, fifty years previously, which, as said Admiral Sir Edward Parry, "No other ship built in an English dockyard would have stood for even one day." As a point of interest Professor Wadia adds that this great grandfather of his was the first Indian F.R.S., a fact of which he is justly proud.

Although such reflections of the glories of our past history are ever vitally entertaining, I trust you will nevertheless accept my apologies for indulging your time in this manner.

E. C. LANNING

*Arua, West Nile, Uganda*

# MEETINGS: SESSION 1948–49

Nineteenth Meeting, 2 May 1949

*Films:* As Seen by Denmark. Sound films with introduction by Dr. Ingolf Boisen

Twentieth Meeting, 9 May 1949. Professor C. B. Fawcett in the Chair

*Paper:* Land use and surface mineral working in Britain. By Professor S. W. Wooldridge and Mr. S. H. Beaver

20 May 1949. A meeting of the Institute of Navigation

*Papers:* Equivalent headwinds. By A. F. Crossley. Jet streams and their importance in air navigation. By C. S. Durst and N. E. Davies

Twenty-first Meeting, 23 May 1949. The President in the Chair

*Elections to Fellowship:* George W. Brimyard; Major F. Everett Caiger, B.A., M.R.S.T.; Frederick Rex Carr; William H. Deane, B.A.; Joseph P. Dodd; Edward Gerrard; Clifford Gill; Miss Muriel Jones, B.A.; C. S. F. Manchester; Charles E. A. Martinson; Miss Phyllis M. Michael; Miss P. Mary Parsons, B.SC., Roger Thomas Peirson, B.A.; Captain John H. Roscoe; Arthur F. Shawyer; Thomas L. Strange; John Robert Warner; Roy G. Williams; Desmond Worsdale; Stanley L. G. Wright; G. A. B. James.

*Transferred from Associate Membership*: Miss C. V. Benson; Frank Kenworthy

*Elected to Associate Membership*: Miss Nancy Maud Combridge

*Paper:* Geographical aspects of Romano-Buddhist art. By Professor R. E. M. Wheeler

ANNUAL GENERAL MEETING, 13 June 1949. The PRESIDENT, Sir HARRY LINDSAY, in the Chair.

The PRESIDENT: Field Marshal Smuts, Your Excellency, My Lords, Ladies and Gentlemen: We have had a great disappointment this afternoon. Only last Friday Mr. Kirwan and I received from Marlborough House a message to say that on account of the sudden illness of her sister, the Countess Toerring, at Lausanne, Her Royal Highness the Duchess of Kent greatly regretted that she would not, after all, be able to be with us to-day. This is naturally a grave disappointment to us all. We had been looking forward with keen anticipation to the first visit of our Honorary President to the Society's House; but we know full well that only an urgent family call like this could have prevented Her Royal Highness from keeping an engagement to which she had greatly looked forward.

This morning I was honoured to receive the following personal message from Her Royal Highness, addressed to me as President of the Royal Geographical Society:

> "Would you please convey to the Council and Fellows of the Royal Geographical Society my sincere regret that I am not able to be with them at the Annual General Meeting on Monday, 13th June. I send you and all who will be present at the meeting my good wishes."

If the meeting approves I propose to reply as follows:

> "I was most honoured to receive from Your Royal Highness this morning a message which I have read to all present at our Annual General Meeting

this afternoon. They unanimously desire me to express to Your Royal Highness our very sincere regrets that our Honorary President is unable to be with us to-day to take part in the proceedings of this meeting. We send, in reply to Your Royal Highness's most gracious message our loyal greetings to our Honorary President, together with the hope that on some future occasion, perhaps during the coming session, we may have the great honour and pleasure of welcoming Your Royal Highness to the Society's House."

There is one further announcement which I have to make before we proceed to the normal business of the meeting; and that is to invite you to join with me in expressing, in the usual way, a very hearty welcome indeed to Field Marshal Smuts for so kindly consenting to interrupt a brief and busy visit to London to come to this meeting.

You will note, sir, that I have given you the formal rank of Field Marshal.

Field Marshal SMUTS: The King gave it me!

The PRESIDENT: Nevertheless, I understand that your many friends, both in the Union of South Africa and in this country, still continue to call you General Smuts, for auld lang syne. And indeed, there are some, I believe, who call you Field Marshal General Smuts, thus combining respect for your high military rank with a friendly reference to your earlier Generalship. I wish to assure you, sir, that you are here amongst friends and well-wishers who greatly admire you for your statesmanlike qualities, revealed both in South African and Commonwealth affairs, and who know also that you yourself, one of our most distinguished Honorary Members, are personally interested in just those problems of exploration and discovery, in the advancement of the science of geography, which this Society has very much at heart.

Sir, we give you a very hearty welcome and I will, if I may, call on you at a later stage in our proceedings to present the Medals and Awards.

The HON. SECRETARY, Mr. Leonard Brooks, then read the Minutes of the Annual General Meeting held on 14 June 1948, which were confirmed and signed by the President.

The PRESIDENT then gave excerpts from his Presidential Address which is printed in full on pp. 1–5.

The PRESIDENT: We now come to the presentation of the Medals and Awards. With the approval of His Majesty the King, the Founder's Medal has been awarded to Professor L. Dudley Stamp, Professor of Social Geography at the London School of Economics. Professor Stamp is widely known both in this country and abroad for his work in geology and geography, particularly in their bearing on the rational use of economic resources. But it is for his great work as Director of the Land Utilization Survey of Britain that he is best known to us; the knowledge and experience gained from this survey, which he initiated and carried to a successful conclusion in the face of many obstacles with the collaboration of Dr. E. C. Willatts, was put to good use by him during the last war in his capacity as Chief Adviser to the Ministry of Agriculture. I ask Sir Alexander Carr-Saunders to receive the medal on behalf of Professor Stamp.

Sir ALEXANDER CARR-SAUNDERS: Field Marshal Smuts, Mr. President, Ladies and Gentlemen,—My colleague, Professor Dudley Stamp, is unable to be present to-day to receive this Award and I have been asked to represent him. He is an official member of the British Delegation to the Conference on Land Use and Food Production which has been called by the United Nations and is now at work in New York. The fact that this Conference is concerned with land use, a subject which Professor Stamp has so much made his own, will I hope

in your eyes excuse him for his absence to-day. He, I am sure, would like me to express his very deep appreciation of the high honour you have done him, an honour, I should like to add, which is very greatly appreciated also by the University of London, one of whose Chairs he holds, and by the London School of Economics, one of the Colleges of the University of London at which his Chair is tenable. On his behalf I thank you for this honour.

The PRESIDENT: The Patron's Medal has been awarded with the approval of His Majesty the King to Professor Hans Pettersson, Professor of Oceanography at Göteborg Högskola, Sweden. Oceanography is a science in which we as a nation have had a long and vital interest, and in Professor Pettersson we are honouring one who has been responsible for advances in oceanographical technique and who has led the most important post-war expedition for the study of the oceans. Fellows of this Society will remember the very interesting address in which Professor Pettersson described the voyage of the *Albatross* in the Atlantic and Pacific during the years 1947–48, and the methods of obtaining sections of deposits from the ocean floor by the piston core-sampler, and of sounding their thickness, both devised by Swedish scientists. May I ask His Excellency the Swedish Ambassador if he will kindly receive the Medal.

H.E. THE SWEDISH AMBASSADOR: It is indeed a great honour for me to receive on behalf of my compatriot, Professor Hans Pettersson, the Patron's Medal. I beg you, Mr. President, to accept Professor Pettersson's thanks and I beg you also to convey to the members of your Council our expression of deep gratitude.

I think it can be said that for quite a considerable time Swedish endeavours in the field of exploration have met with most generous response from Great Britain. I do not refer to the very far-off days of the vikings because I am not convinced of their scientific spirit! I do however refer to the last hundred years, or so, when Swedish efforts in geographical exploration have received support and very generous response in this country, more particularly by this great Society of yours. That you have decided this year to award the Patron's Medal to Professor Pettersson is to me confirmation of this great tradition, and for that I thank you.

The PRESIDENT: The Council have awarded the Murchison Grant to Lieutenant-Colonel E. H. Thompson, C.B.E., R.E., of the Ordnance Survey. Colonel Thompson has carried out much research into the intricate problems of using air photographs for accurate mapping, including the control of photography by radar. He has also shown himself adept at designing survey instruments, and this award is made to him particularly for the development of stereoplotting machines. I will ask Mr. Thompson to accept the award on behalf of his son.

Mr. Thompson having accepted the award,

The PRESIDENT said: The Back Grant has been awarded to Dr. Brian Roberts, for his contributions to polar history and to the technique of polar travel. Dr. Roberts has extensive first-hand acquaintance with both the Arctic and Antarctic regions, in particular as a member of the British Graham Land Expedition of 1934 to 1937. During the war his experience and knowledge in this sphere were of great value. As Research Fellow at the Scott Polar Research Institute, Cambridge, he has pursued his studies in the history of Antarctic exploration, and also into the development of methods of travel in Polar conditions. I ask Mr. Wordie to accept the award.

Mr. J. M. WORDIE: Mr. Roberts who is unwell has sent me some words which he would like to have said himself this afternoon. With your permission I should like to quote from them. He thanks the Society very much for this honour and particularly for the great encouragement in the Society's recognition

of the two essential requisites for exploration: historical research into what has been done before and the necessary specialized method and equipment.

The PRESIDENT: The Gill Memorial has been awarded to Dr. O. H. K. Spate, Reader in Geography at the London School of Economics. Dr. Spate has been a university lecturer in Burma, and has studied the human geography of that country and of India. During the work of the Boundary Commission in the Punjab, following the separation of India and Pakistan, he was adviser to the Moslem groups, and he has lectured to our Society on the geographical aspects of the partition.

Dr. O. H. K. SPATE: It would be impossible to say whether I was more gratified or surprised when I learned that I was to receive this very generous appreciation of my work, which I cannot claim has been outstanding in any way. What is outstanding is what remains to be done for the geography of India and Pakistan, and here I feel I am on the lowest and outermost spur of the Siwaliks with all the mighty mass of the Himalaya before me. There have been many great names which have shed lustre on the Society and on Indian geography—Oldham, Holdich, Younghusband—to name but three. I cannot hope to emulate them; but I can hope to do something towards gathering together their scattered wealth. Although that is a humbler task I accept this award most gratefully as an encouragement to that task. May I also say how glad I am that the School which I have the honour to serve has been distinguished this afternoon by receiving two of the Society's awards.

The PRESIDENT: The Cuthbert Peek Grant has been awarded by the Council to Mr. A. B. Crawford, B.E.M. Mr. Crawford first went to Tristan da Cunha as surveyor to Dr. Christopherson's expedition in 1937. During the war he returned to that island as a meteorological observer with the South African Air Force, and in 1946–47 was in charge of the Meteorological station maintained there by the South African Government. In 1938 he was sent on similar work to Marion Island, where he also carried out a survey. I invite H.E. the High Commissioner for South Africa to receive this award.

H.E. THE HIGH COMMISSIONER FOR SOUTH AFRICA: It is a great pleasure on behalf of Mr. Crawford to accept this award and to convey through you, Mr. President, to the Society his deep pride and thankfulness for this recognition of his work. His pride can only be tempered by regret that due to circumstances, principally to geography, he has been unable to receive the award in person; the more so as it would have added very much to his pride to have been able to receive it from the hand of him who sent him on his expedition. I will not say anything of the nature of the work as I hope that the distinguished Honorary Member who has presented this award may himself have occasion to mention the nature of the work which Mr. Crawford undertook. I would however like to add the expression of my pride as a South African in the fact that this illustrious Society should so have recognized the geographical and scientific work undertaken by a countryman of mine.

The PRESIDENT: I now ask Field Marshal Smuts to address us.

Field Marshal SMUTS: Mr. President, I feel a special pleasure in being here this afternoon to join with you at this your Annual General Meeting. I wish, in the first place, to associate myself with your President in expressing regret that Her Royal Highness the Duchess of Kent is not able to be present. Her Royal Highness sent me a special message to express her deep regret that circumstances had prevented her from being here.

I am especially pleased to join with you in doing honour to the recipients of the Medals and Awards. We who sit here in London, the safest place in the world to-day, have little knowledge of what the recipients have gone through in

order to deserve these honours—the sweat of brain and brow; heavy exertions, hard labour and dangers endured. I repeat that I am most happy to join with you in honouring the recipients.

I am happy also to be at this Annual General Meeting to hear of the continued wonderful work which this great Royal Geographical Society is carrying out. Listening, Mr. President, to the excerpts from your Presidential Address, I have realized how vital the service of the Society continues to be. The Royal Geographical Society has through many generations carried on an immense task in fostering and maintaining geographical science and exploration. Not only from the point of view of the Society's membership and income but from the point of view of the results achieved the Society has a wonderful record. As one of your Honorary Members it is a pleasure to have the opportunity to pay my little tribute to the great work which has been carried on by the Society throughout many years.

It is long since I had the privilege of attending a meeting of the Society. I wonder whether any here remember that last occasion. It was during the First World War and as it was a very big meeting and you had not then this Hall it had to be held in the Central Hall, Westminster. I was then lecturing on East Africa. Soon after my lecture commenced the police appeared on the scene and asked if we would adjourn the meeting or go to a lower hall because a heavy air raid was in progress in the neighbourhood. I announced to the meeting that I had been warned by the police that there was great danger to life and limb; I said I myself was prepared to remain but had the audience not better go to a safer place. However, all volunteered to remain and whilst the Hun was carrying out a heavy air raid on the City and the nearby guns were booming, we saw our business through. That was in 1917, and here we are once more having been through an even greater World War. Nevertheless, this Society continues to carry on unperturbed, still doing the work it set out to do. I am pleased to be here after so many years to join in this ceremony.

As I have said, I was at that meeting thirty-two years ago lecturing on East Africa. I was following in the footsteps of a very great man. You will recall that the Royal Geographical Society away back in the nineteenth century was responsible for financial assistance to Livingstone when he was carrying on his great explorations and journeys, almost beyond human endurance, in that very area of East Africa on which, more than two generations later, I was lecturing to the Society. With the Society's assistance Livingstone carried out investigations into the source of the Nile and the geographical features of that great country, then unknown, of Central Africa. To me, as an old reader of, and as one interested in, the work and reports of Dr. Livingstone, it was a matter of gratification that after long years I had the privilege to lecture on the country in which he had spent so much of his time and in which, in the end, he died.

Well, here we are to-day. The work goes on and we have had this afternoon evidence of the success with which that work has been carried on. I do not wish to detain you but I would like to add a few words in reference to one of the recipients of the Awards, Mr. Crawford. As has been said, I was responsible, when Prime Minister of South Africa, for sending an expedition to Marion and Prince Edward islands. As you probably know, these islands lie off the Great Barrier some distance south of South Africa. They had nominally belonged to Great Britain for more than a century but they were most forbidding and uninhabitable. They had scarcely even been visited until the expedition went to them, certainly the British authorities had never occupied those islands; nobody had thought them of any value whatever. But you all realize,

I am sure, that we are now living in a changed world, in a world in which forgotten lands are being attended to because people are becoming sensitive and alive to the dangers that threaten from new sources and new developments in science. Therefore, it was necessary to point out to the Home Government the danger of leaving those islands derelict in the Antarctic, or not far distant from that area. Well, the Government was not interested. Why should it be? So the task fell on us in South Africa to volunteer to undertake the work and to see about the occupation of these islands. Accordingly, an expedition was sent to the islands and we have occupied them ever since.

Mr. Crawford was the surveyor who went and surveyed Marion and Prince Edward islands which had not previously been surveyed. He did his work very well indeed, and that is the work for which the Society has honoured him. On Marion island there is a high mountain, as high as Table Mountain if not higher, and Mr. Crawford who has a vivid imagination thought that I, as the man specially connected with the origination of his work, should have my name given to that piece of Marion island. So it came about that the mountain there was named after me. Mr. Crawford made a very careful and efficient technical survey of both the islands, Marion to the north and, twelve miles south, Prince Edward island. As I have said, those islands are now in our occupation and we have put up a warning to that effect for the information of anybody else who wishes to go near them.

Some distance east of these two islands lies Heard island which has been occupied by Australia, so that we have now south of the two continents of South Africa and Australia a belt of islands, including Gough island and Tristan da Cunha, also surveyed by Mr. Crawford, Marion and Prince Edward and Heard islands. Nobody ever previously bothered about most of those islands, but they may become important. Distances disappear, space and time have been mopped up by science, with the result that if there is a route in the world which should be kept open for the future it should be taken hold of now; it may form a future line of communication of great importance to the security of the world. So there we sit on Marion and Prince Edward islands, and there we shall sit for a very long time, Mr. President.

It is a fine gesture on the part of the Royal Geographical Society to honour one who has done his work so well. Mr. Crawford and his party spent many weary months in the most intense cold and under most trying physical conditions. With a party of men from Tristan da Cunha he lived on Marion island, and those men were in a position to draw comparisons between life on Tristan da Cunha and on Marion island; suffice to say that they were very thankful to leave Marion island and return to Tristan da Cunha. I have no intention personally of ever attempting to climb Jan Smuts peak on Marion island!

I thank the Royal Geographical Society most sincerely for this gesture and for the honour they have done Mr. Crawford. I feel sure he will appreciate it to the full. Finally, I thank you, Mr. President, for the opportunity to be with you all this afternoon to share with you the advancement of the work which is still being carried on by this Society, work deserving of all the financial and personal support it can get either from the public or the Government. I wish the Society all possible success in the future and may it be greater than the wonderful, and even spectacular, successes achieved in the past.

The PRESIDENT: Field Marshal Smuts, we thank you very much, and may I say how extraordinarily encouraging your remarks have been to us and how closely they deal with matters which are near to our own hearts.

In the ordinary course this is the stage at which visitors retire from the meet-

ing but, greatly daring, I should like to create another precedent and suggest that it would be nice if they would remain.

The PRESIDENT then appointed Mr. John G. Murray and Lieutenant Commander Quentin Riley to act as scrutineers of the ballot for the Council and Officers for the ensuing year.

The PRESIDENT: While the ballot is in progress I should like to say something about each of the new members proposed for election to the Council. Brigadier R. Ll. Brown, formerly Director of Military Surveys, has recently succeeded General Cheetham as Director General of the Ordnance Survey. Lieutenant-Colonel Croft, D.S.O., leader of Exercise Musk-Ox in the Canadian Arctic, is now working at the War Office. Dr. Edward Lynam is in charge of the Map Department of the British Museum. Miss Jean Mitchell, is Lecturer in Historical Geography at the University of Cambridge, Wing Commander E. A. A. Shackleton, M.P. for Preston, was awarded the Cuthbert Peek Grant in 1934 for his expedition to Ellesmere Land. He has recently been appointed Parliamentary Private Secretary to the Minister of Supply. The final name on the list is that of Mr. R. W. Steel, Lecturer in Colonial Geography at Oxford; awarded the Murchison Grant in 1948 for his part in the Ashanti Social Survey. While the ballot was in progress the President drew attention to the main items of the Annual Report which had been circulated to fellows.

The President inquired whether any Fellow had any question to ask or comments to make in regard to the Report.

A MEMBER: Might I ask for the Society's House to be reopened on Saturday afternoons?

The PRESIDENT: That matter has received the careful consideration of the Council. Unfortunately, we have not found in the past that there has been sufficient response to justify the keeping open of the House during Saturday afternoon. It involves overtime and extra work.

The MEMBER: Have there been any further requests for that particular facility?

The PRESIDENT: Not sufficient to justify the Council in reconsidering their decision, sir.

The Annual Report was adopted.

The scrutineers informed the President that the list of candidates proposed as Council and Officers for the ensuing year had been elected (see list, volume preliminary, following title page).

The PRESIDENT thereupon declared the Council and Officers, as proposed, duly elected, adding: As there is no other business, ladies and gentlemen, that concludes our meeting.

The Rt. Hon. The LORD RENNELL OF RODD: Ladies and Gentlemen, before the meeting breaks up, as your President's predecessor, you would, I feel, like me to convey to him your thanks for the conduct of the Society's affairs during the last twelve months. I had a very easy time when I was President. It was the aftermath of the war; we were re-building and everything was going very well. To-day the horizon is, perhaps, a little more dark, and it is your present President who is going to have to weather any storms which may come. However, if last year's activities are any sign of how those storms are likely to be weathered, you will, I am sure, agree that the Society's affairs could not be in better hands.

The PRESIDENT: Thank you very much, Lord Rennell, ladies and gentlemen. I charged you once, sir, with having shown such a good precedent as President that I should find it extremely difficult to follow in your shoes. Nevertheless, I am most grateful for all you have said.

17 June 1949. A meeting of the Institute of Navigation

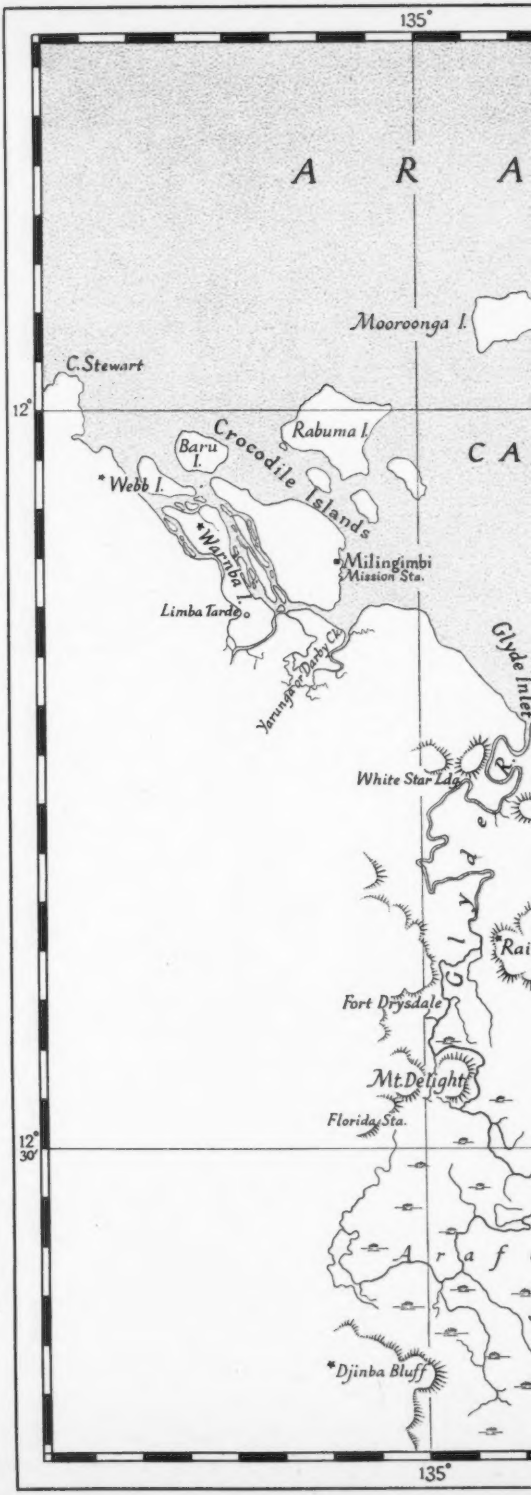
*Papers:* Astronomical navigation in the air. A discussion on methods to obtain speed and accuracy

The following were elected to Fellowship and Associate Membership of the Society on 18 July 1949

*Fellowship:* Mrs. John Aiken; Eric Axelson, LITT.D.; Peter D. Barnitt; Miss Joyce Berryman, B.A.; Dewi Brulard Beynon; Horace A. Bradding; John T. Browne, B.A.; William H. Carter; Brigadier C. Clarke, M.C.; John Arthur H. Claudet; John N. Constantine; Captain John W. S. Dominy; John A. Donaldson; Kenneth John Earle; Lieutenant-Colonel D. MacDuff Fife, I.A. (Retd.); George Pearson Ford; C. R. Gardner, B.A.; E. P. Ghee; C. H. Gobie; J. Stanley Grimshaw, B.SC.; Kenneth B. Hampton; Rev. Eric William Hayden; Lieutenant Robert G. Higgins, R.N.; Iain Hutchinson; Miss Monica Krippner, F.R.A.I., F.R.E.S.; Sydney D. Lambert; Phillip Garth Law, M.SC., A.INST.P.; John Hender Mankin; George R. Manning; Frank Martin, B.A.; Sidney W. Millard; E. J. E. Mills; Krzysztof P. Muszkowski; Dwarka Nath, M.R.A.S., M.R.S.L.; Dennis C. Osadebay; Lady Flinders Petrie; Jack Pickford, B.A.; Miss Kathleen Margaret Postlethwaite; John Charles Pugh, M.A.; Lieutenant Commander Jack N. Richards, R.D., R.N.R.; Lieutenant Guy David Kemp Robinson, R.N. (Retd.); Reverend Calvin Ryan, B.A.; Edward St. George; Lady Clavell Salter; G. H. Scheepers, B.A., B.SC., M.SC., D.SC.; Christopher W. Scott; K. K. Sharma; Reverend R. J. A. Sheriffs; Dwarka Nath Sinha, B.A.; B. W. Sparks; Samuel T. Tyler; William R. H. Walters, B.COM.; A. D. G. Webb; Reverend Robert U. G. Williamson, B.A.; B. A. Workman, M.A.; Herbert Dyer Wright.

*Associate Membership:* Robert Arthur Knowles; Paul Robin Adair; Miss G. E. Dougherty; Edward J. McCabe; Miss Mavis D. Pollard; Miss Betty Smith.

*Published September 1949*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°Karrama
*Stewart Collie Ck.
Joan Elizabeth Ck.
Bradshaw Ldg.
*Harry
*Crone Ck.
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Map of North-East Arnhem Land
by Dr. Donald F. T
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by Dr. Donald F. Thomson

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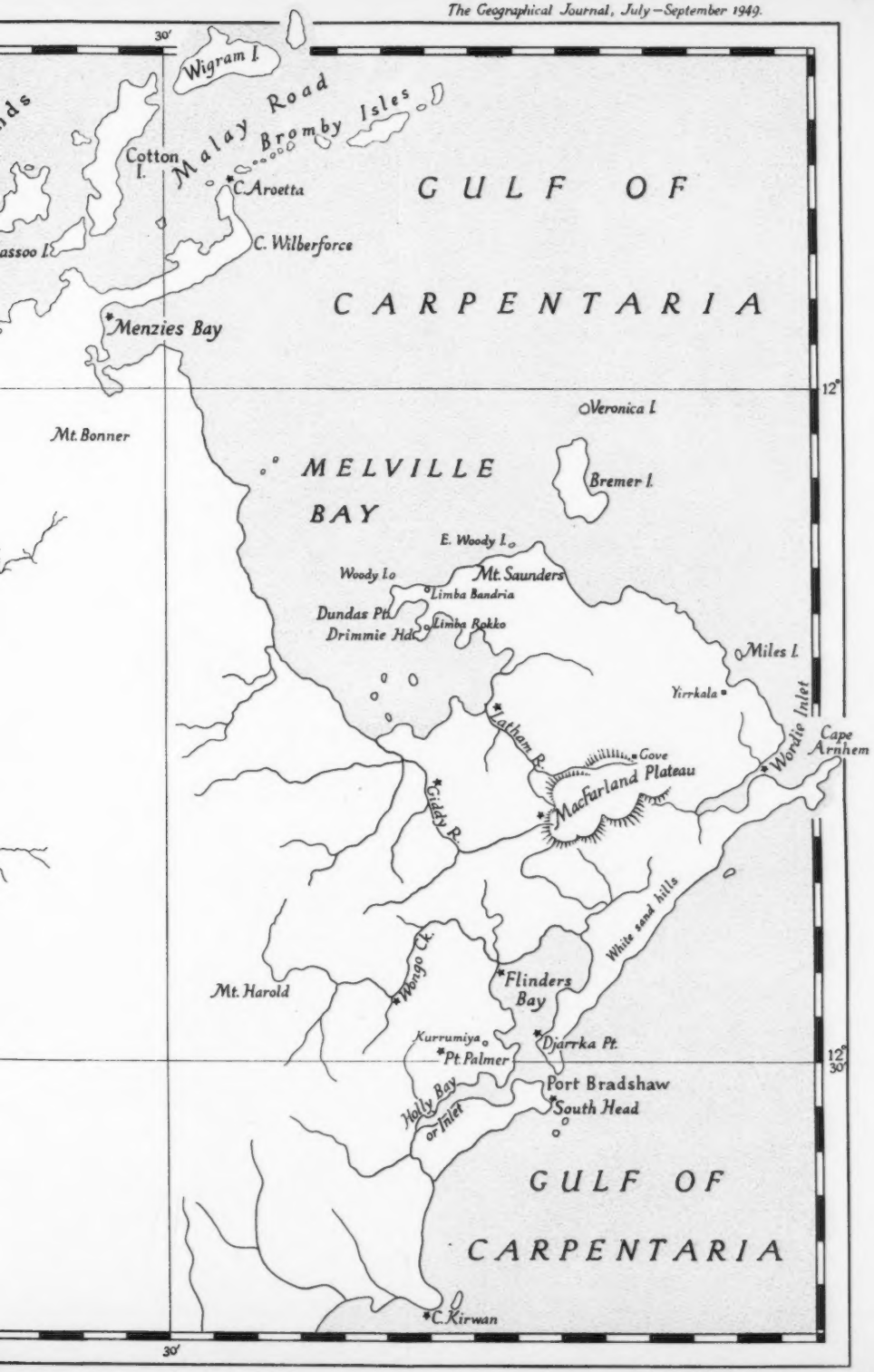


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